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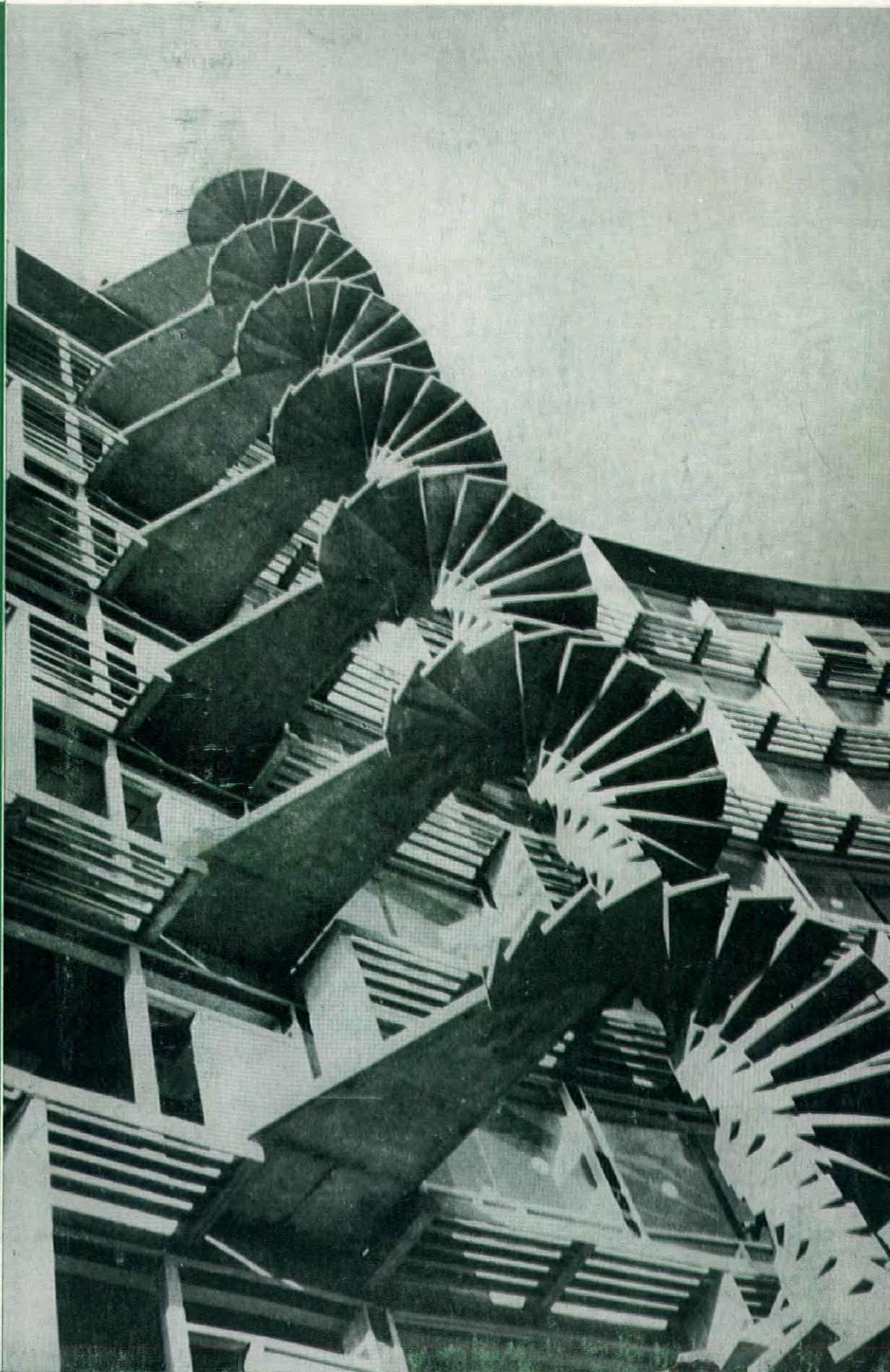
JOURNAL

of The American Institute of Architects

OCTOBER 1958

Henry S. Churchill:
URBAN ESTHETICS

Lewis Mumford:
THE DISAPPEARANCE
OF PENNSYLVANIA
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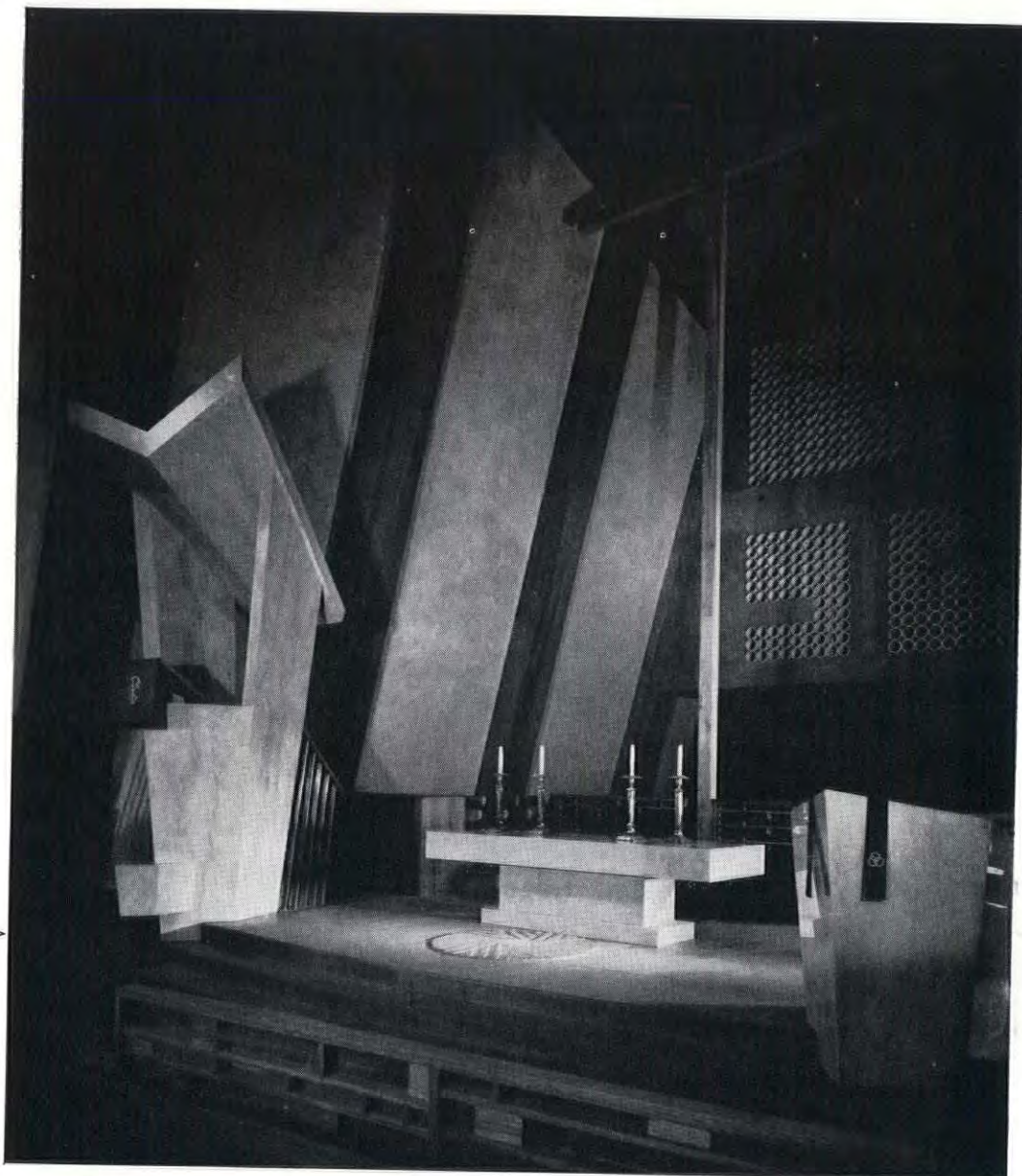
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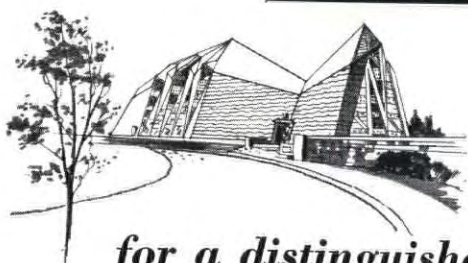
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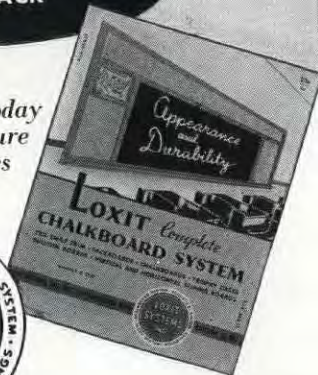
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*Cover: Fire Access Stairs of Permanent Headquarters Building
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The Journal of The American Institute of Architects, official organ of the Institute, is published monthly at The Octagon, 1735 New York Avenue, N. W., Washington 6, D. C. Editor: Joseph Watterson. Subscription in the United States, its possessions, and Canada, \$4 a year in advance; elsewhere, \$5.50 a year. Chapter Associate

members, \$2.00; Students, \$1.50. Single copies 50c. Copy right, 1958 by The American Institute of Architects. Entered as second-class matter February 9, 1929, at the Post Office at Washington, D. C., under the Act of March 3, 1879. Change of Address: Notify The Octagon, giving both old and new addresses. Allow four weeks for change.

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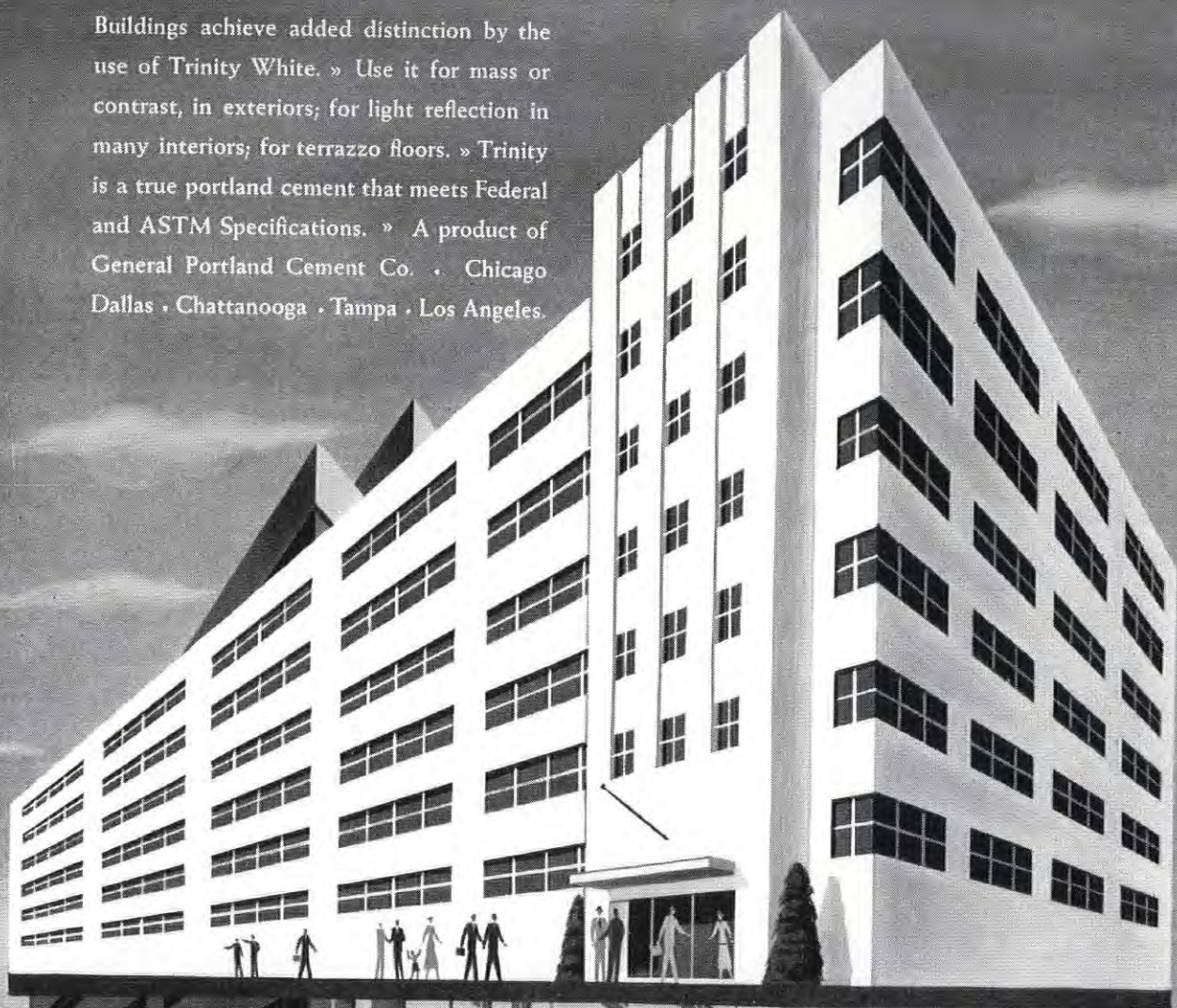


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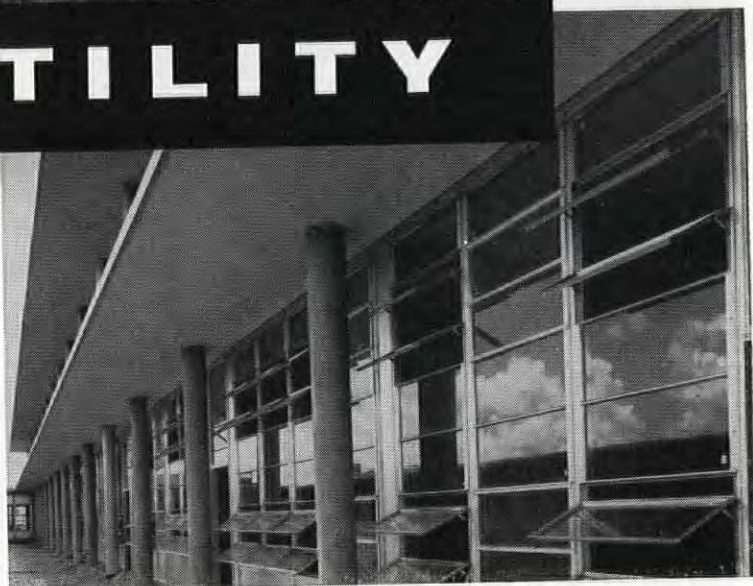


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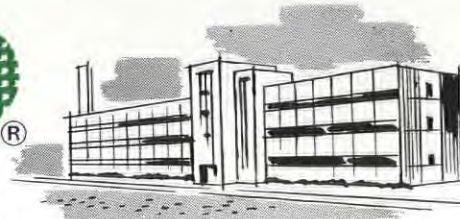


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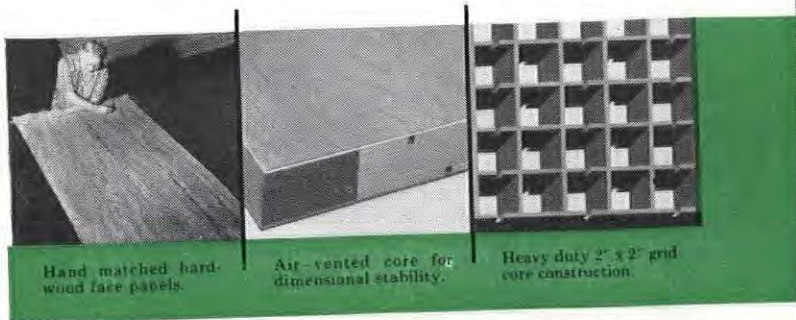
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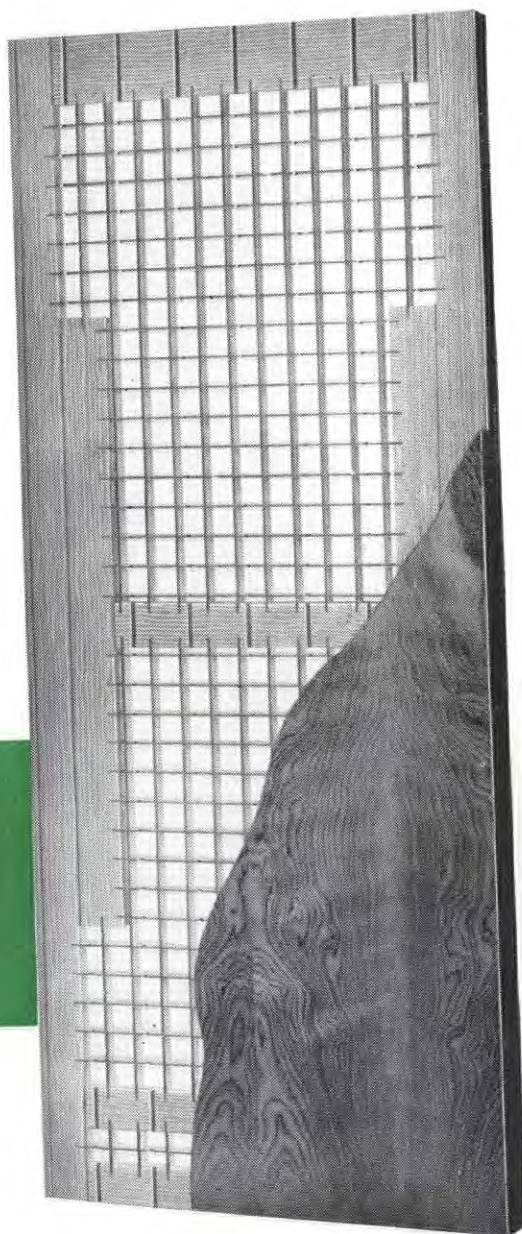


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Letters to the Editor...

EDITOR, *Journal of the AIA*:

We shall be very fortunate if the uneasy state of affairs with which we architects are currently familiar does not worsen rather than improve. In fact, we shall be far more lucky than deserving.

If we believe, for one moment, that we can survive professionally with myriad technological advancements, fluctuating economic scales and revolutionary design and construction practices, merely by sitting on our hands and burying our heads like ostriches in the sands of indifference, the ultimate awakening that we are destined to experience will be more than rude.

It is vitally important that architects commence paying more attention to ethics, harmonious relationships between client and contractor and also themselves, and to engender more enthusiasm and respect in the employee toward his work.

The evolution, history and practice of architecture must be thoroughly appraised as a whole and not as divided facets in conjunction with economics and human relations. Any attempt to individualize these components is detrimental to our destinies as architects.

Unlike many other professions, we are plagued with the phenomenon of cycles which are repetitions of conditions that have existed in times past.

For instance, economics and not esthetics, nor any new school of design philosophy, caused architecture to become stark and unadorned. But, in recent years, we have moved into another, more familiar orbit, which many purists might consider as retrogressive.

During the past decade high capacity construction activity has again been employed to the maximum. Therefore, due to economic and intellectual abundance we are witnessing a return of the cycle which fosters architectural motif and ornamentation.

This state of affairs has been compacted into a few short years rather than centuries. No longer have we the acanthus leaves with us but the philosophy of their original application once more seems to be returning.

However, with the return of the old in modified form, something drastically new is taking hold within the profession.

There seems to be a growing tendency to promote the idea among many practitioners that buildings should not be constructed to last any longer than the latest clothing fashions and not, as in years gone by, be erected for eternity.

The daring innovations that have come about in the construction world have chosen to ignore the elements of strength and durability during recent years.

With the advent of prosperity and the natural desire for self improvement, the once abundant supply of skilled building mechanics seems to be decreasing.

This may be attributed to the fact that young men are seeking their careers in the white collar, business, scientific and professional fields, rather than in those identified with blue denim and manual work.

Although a good plumber might earn an equal or better annual income than many in learned careers, this fact has not had much bearing on influencing them in a choice of profession.

An indication of the diminishing supply of skilled building mechanics is indicated by the tremendous volume of curtain wall construction going on throughout the nation, replacing the more familiar and conventional masonry walls.

Labor and material costs and the demands for more rentable floor area are not the least cause for such conditions existing.

Consequently, instead of a young man following a career in the skilled building trades he is more apt to be interested in learning the multiple uses of a T Square, pencil and slide rule.

Despite the heavy influx of highly skilled professional help into offices and draughting rooms, especially in the larger firms during boom times, many of these younger people are finding themselves increasingly frustrated, in spite of their considerable earning capacities.

(Continued on page 14)



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(Continued from page 12)

This seems to be largely due to the great technical complexity of the work, allowing far less opportunity for creativity to those who embarked upon such careers because they possessed strong creative powers. In due time this might result in the same situation that is currently facing the building trades.

Also, there is the matter of job security to be considered. Architects and engineers are not inclined to worry about a personnel market glut when times are slack, but they complain agonizingly when a deluge of new commissions rolls in and they have insufficient people to complete their very necessary staffs.

Similarly, employees are frequently inclined to shift from position to position, lured by the promise of higher remuneration but neglecting to remember that they were often retained in offices during slack periods so that they could form a working nucleus when new jobs came in.

In fairness to all, the fault can be equally attributed to both sides where such inconsideration exists.

Education and self improvement are wonderful things, but two of the natural by-products of these advantages are usually ambition and discontent.

This leaves the architects skating on thin ice where future personnel problems are concerned.

The boom and bust cycles in construction and the resulting hire and fire practices are as much resented in professional offices as they are in the building trades.

Not many years ago the organized labor negotiations affecting the automobile industry introduced a guaranteed work year clause in their contracts. The AF of L and the CIO sponsor a guild for architects, engineers and draughtsmen. It is popular with professional and technical staffs employed by large industries and corporations.

Consequently, one is inclined to wonder if eventually contracts comparable to those existing within the automobile industry will not become commonplace in the offices of architects and engineers?

Personnel seeking fair practice policies and security in both professions, especially those lacking private resources and connections, are inclined to favor such collective bargaining organization.

In areas where the practice is prevalent a noticeable increase in salaries, even in offices that are in the environs but are not organized, has invariably resulted, thus stimulating the incentive toward organization.

However, there are certain drawbacks. Whereas, it tends to be democratic in that it places working staffs on an equal footing, not permitting undue preference to be shown toward one person at the expense of another, the time is still to come where it can be ascertained if the gifted and talented people will be permitted to advance themselves ahead of those who are merely good at their work.

One cannot help but remember that when socialization first made its appearance in the medical profession in England, a great exodus of trained practitioners and specialists departed from the United Kingdom for other Commonwealth countries and the United States.

If this pattern of dissatisfaction were to repeat itself among professional people in North America under similar conditions, where could they go if they opposed it?

In the best tradition of free enterprise, to be identified with the many benefits that unquestionably comprise the great American heritage, it is the principals and their immediate associates in a professional firm who stand to gain recognition or profit from the practice that affords them their livelihoods. And this only after diligent contact pursuits, hard work and production, which often causes strain and pressure.

To many this realization has become a motivating force toward collective organization instead of suffering the more arduous and competitive tasks of opening their own practices.

Thus, in the light of such considerations, probably resulting in the future birth of fewer private

practices, while trained personnel seek opportunities on the staffs of large industries, corporations and offices, we may very well be witnessing the death rattles of a great many private practices.

Meanwhile, as architects, we might aid ourselves by considering our profession in the light of history, economics and human values and in the basic aspects of design and construction—this in conjunction with highly ethical practices designed to make our lot easier and to earn the respect of the laymen whom we require as clients. Thus we might perpetuate ourselves as individuals.

CREIGHTON AQUIN, R.A.
New York, N. Y.

EDITOR, *Journal of the AIA*:

In a recent *Journal* you printed a letter from one Rollin Jensen of this fair city (Who is he? "Baby dear, out of the Somewhere into the Here.") praising effusively articles by one Alfred Bendiner.

Will you also permit some strictures about this same gentleman whose articles appear so steadily?

From his caustic comments and caricatures, he apparently considers all other architects as nit-wits, sourballs, senile or comatose. Collectively and individually, he criticizes the actions and the opinions of our profession. Like little Johnny, they are all out of step except himself.

A little such clever sarcasm is amusing, but it gets tiresome. Does this really tend to improve our standards—for which, otherwise the *Journal* has maintained such a valiant effort?

You may care to check the listing of my modest career—from a critical standpoint—in "*Who's Who in America*" since 1940.

HARRIS C. ALLEN, FAIA
San Francisco, Calif.

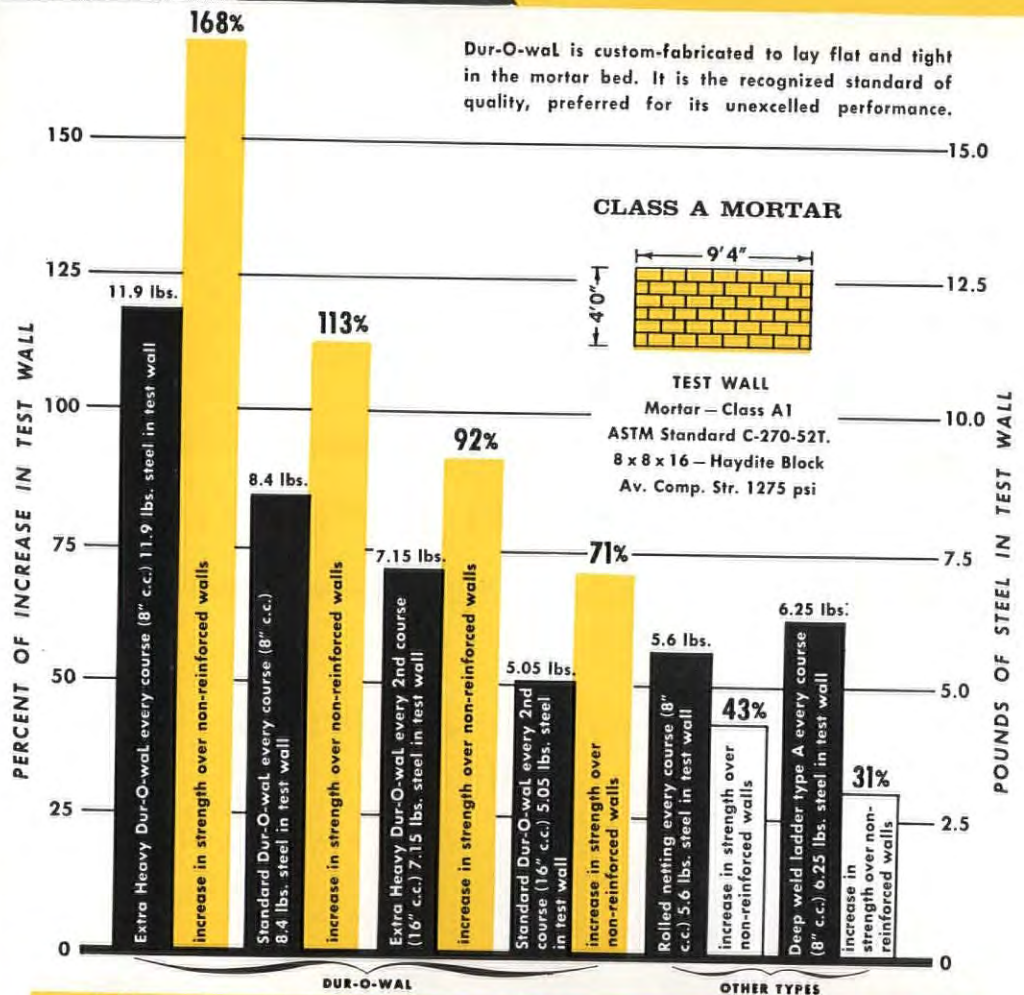
EDITOR, *Journal of the AIA*:

Please accept my congratulations on the August *Journal*. It is the finest issue I have ever seen, and it confirms my belief that the *Journal* can be the nation's leading architectural publication.

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The design of a 20-classroom, 2-story Florida urban elementary school by Connell, Pierce, Garland and Friedman, Miami, Florida, factually proves that, in many instances, air conditioned schools can actually save money on capital investment and, at the same time, completely offset the increased operating cost of the air conditioning system.

HOW CAPITAL INVESTMENT IS SAVED—This school was designed for a densely-populated area of Florida. To take full advantage of natural cross-ventilation and avoid noise distractions, conventional schools have had to be spread out and sprawling. This required large plots. Since school boards have paid as much as 50 to 60 thousand dollars per acre for school property, total acreage is an extremely important cost factor.

Because of air conditioned design, this building consumes only 1.2 acres instead of the customary urban Florida total of 3.1 acres. Thus, 1.9 fewer acres are needed. The

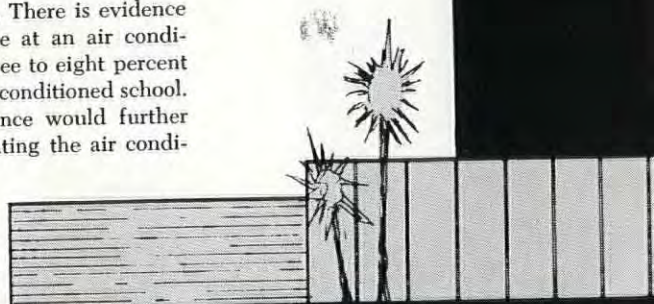
resulting capital savings are in direct proportion to the cost of land.

HOW OPERATING COST IS OFFSET

—Normally, a school of this size requires four custodians. In this air conditioned design, dust conditions are alleviated to the extent that only three custodians could adequately handle the work. The resulting salary savings would bring the operating cost of the air conditioning system down to \$5 to \$10 per day.

Many state school laws (including Florida's) provide that incremental teachers' salaries be paid from State to County School Systems on the basis of average daily attendance, rather than enrollment. County taxes must make up the difference when there are mass absences. There is evidence to prove that attendance at an air conditioned school is from three to eight percent greater than at a non-air conditioned school. Thus, increased attendance would further reduce the cost of operating the air conditioning system.

Because of air conditioned design, this school building (including parking facilities) consumes only 1.2 acres, instead of the customary urban Florida total of 3.1.



Number three
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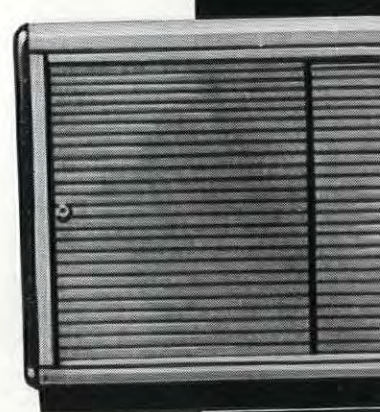
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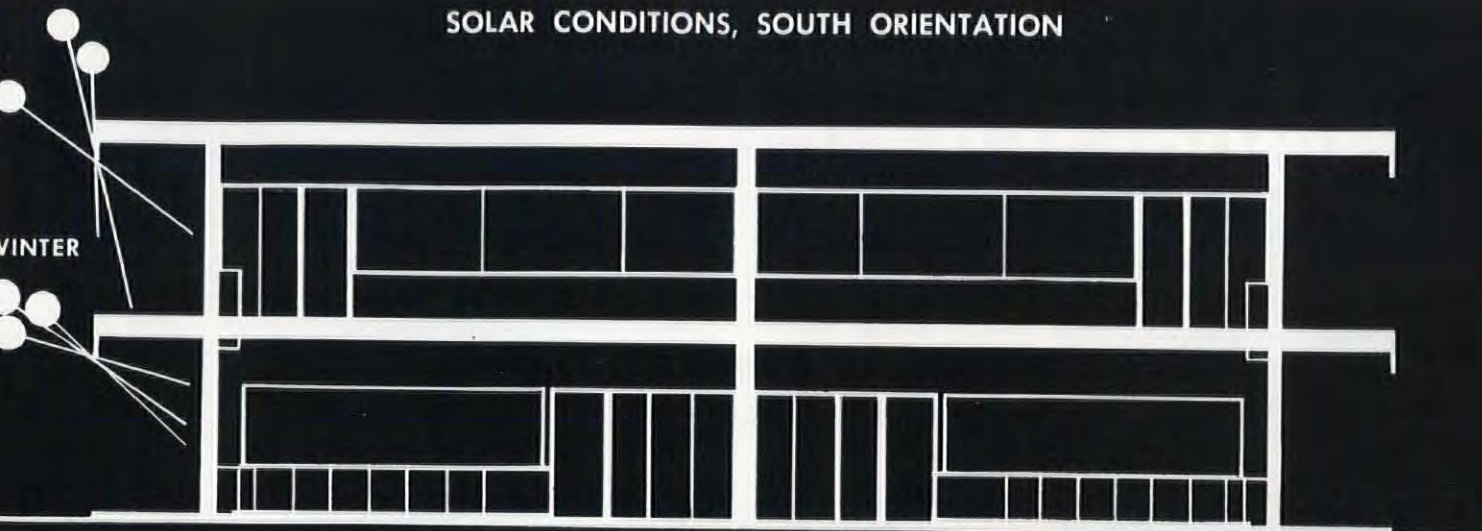
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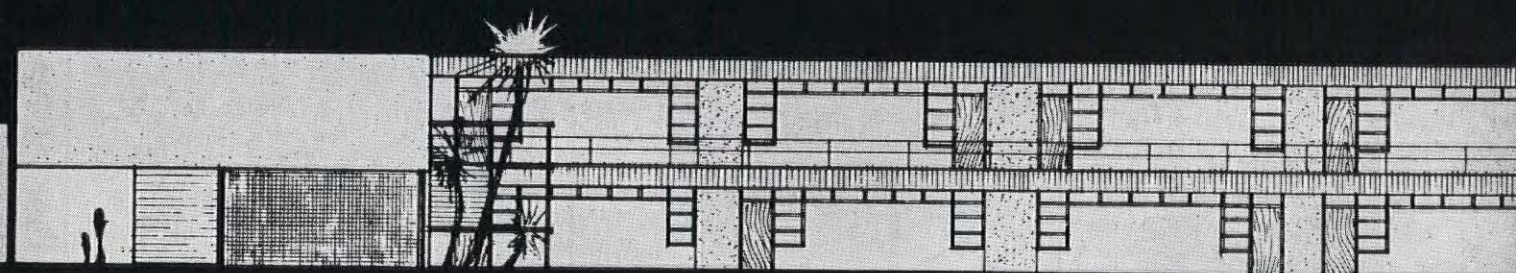
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SOLAR CONDITIONS, SOUTH ORIENTATION

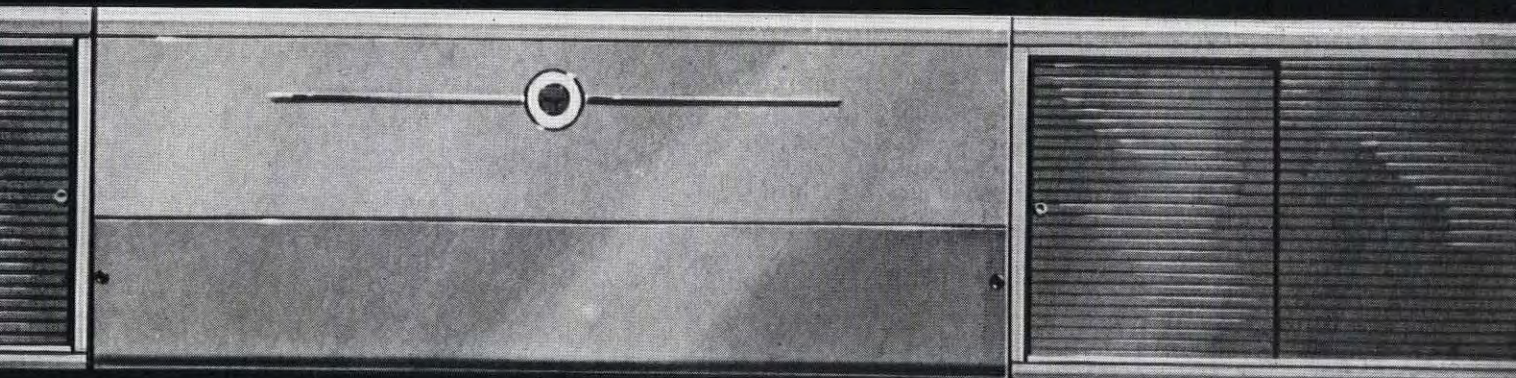
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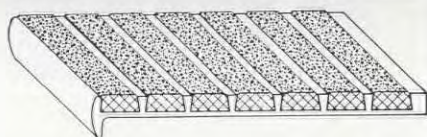
of air conditioned school design



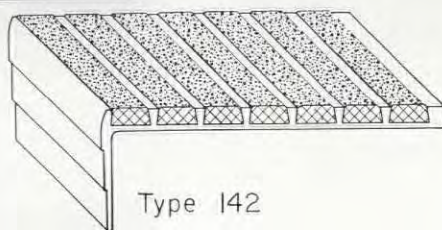
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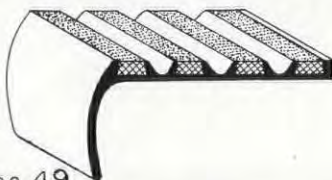


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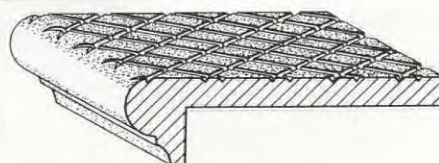


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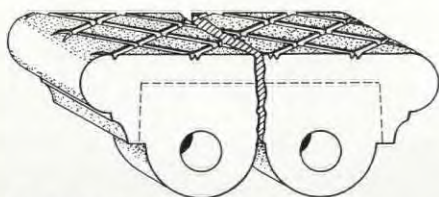


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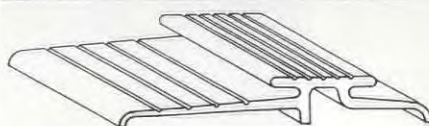


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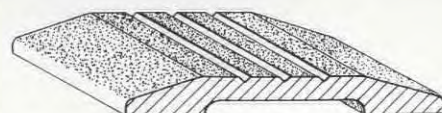


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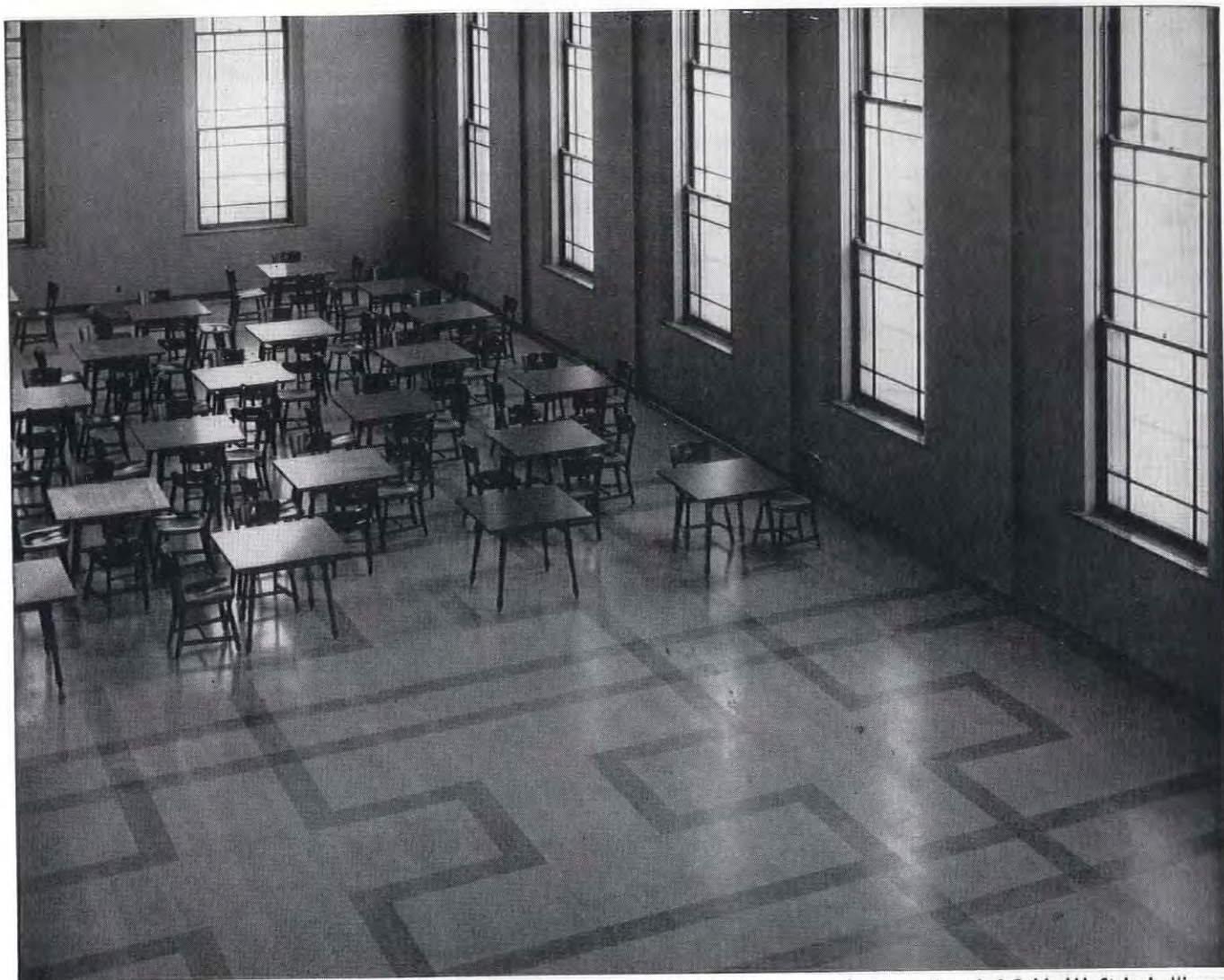


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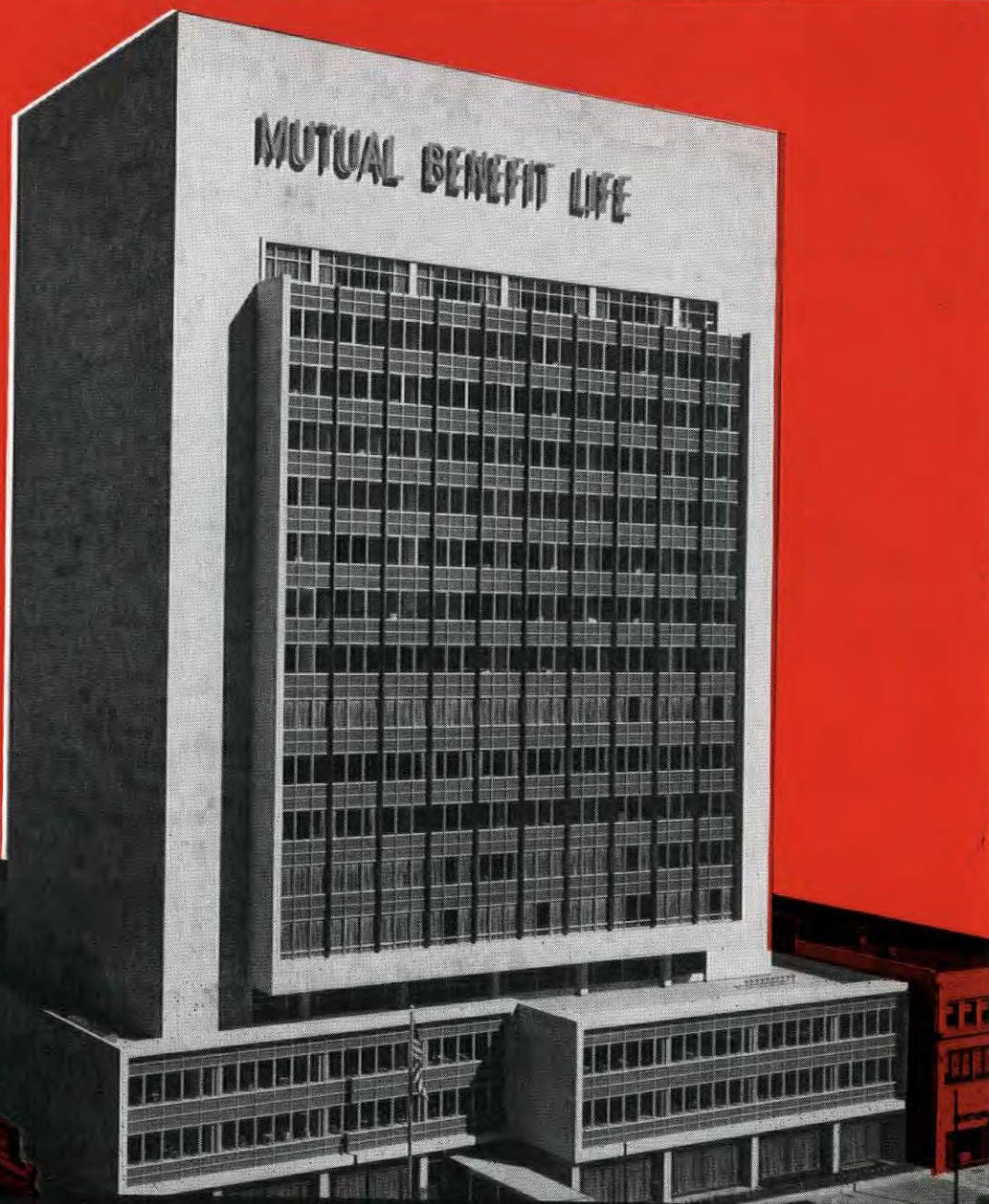
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JOURNAL

OF THE AMERICAN INSTITUTE OF ARCHITECTS

VOL. XXX, NO. 4

OCTOBER 1958

Opinions expressed by contributors to the AIA Journal are not necessarily those of the AIA

Urban Esthetics

HENRY S. CHURCHILL, FAIA

Here Mr. Churchill discusses such urban esthetic problems as the scale of high rising buildings, the gridiron plan, the formlessness of new residential areas, and the fragmentation of the city caused by parking areas and new highways.

THERE IS PROBABLY no other topic of general interest, unless it be the weather, which is easier to talk about than esthetics. Talk about the weather is usually harmless and always futile, talk about esthetics is usually futile and mostly nonsensical. Starting from undefined premises it falls rapidly into semantic confusion and ends up with "De gustibus non disputandum," "One man's meat is another man's poison," and "I don't know nothing about it but I know what I like."

So we might as well concede that there is little possibility of giving a working definition of beauty that will be generally acceptable, something even able philosophers have not succeeded in doing. It might be well to quote Santayana on this. In the beginning of that perceptive analysis, "The Sense of Beauty," he remarks, "It would be easy to find a definition of beauty that should give in a few words a telling paraphrase of the word. We know on excellent authority that beauty is truth, that it is the expression of the ideal, the symbol of divine perfection, and the sensible manifestation of the good. A litany of these titles of honour might easily be compiled, and repeated in praise of our divinity. Such phrases stimulate thought and give us a momentary pleasure, but they hardly bring any permanent enlightenment. A definition that should really define must be nothing less than the exposition of the origin, place, and elements of beauty as an object of human experience . . . Nothing less will

really define beauty or make us understand what esthetic appreciation is. The definition of beauty in this sense will be the task of this whole book, a task that can be only very imperfectly accomplished within its limits."

How imperfectly is revealed at the end when, after much stimulating thought and more than momentary pleasure, we find these among his final lines: "Beauty as we feel it is something indescribable: What it is or what it means can never be said . . . It is an affection of the soul, a consciousness of joy and security, a pang, a dream, a pure pleasure. It suffuses an object without telling why; nor has it any need to ask the question . . . It is an experience: There is nothing more to say about it . . . beauty is of all things what least calls for explanation." Which is where we came in.

Neither scholarly knowledge nor philosophical reason is a substitute for the experience of beauty. Reading scholars like Panofsky or philosophers like Cassirer, who know all and see nothing, one realizes that profound knowledge of minutiae, the exact recognition of objects, the atomization of the visible, are not substitutes for feeling. Reading those philosophers who have sought to define beauty, one becomes aware of a Principle of Esthetic Indeterminacy: The very process of definition so alters the subtle thing that it is no longer the thing defined.

Elusive, indefinable, the sense of beauty exists, and seemingly exists, to a greater or less degree, in

everyone. * In one person the emotion, the enchantment, may be aroused by a Chinese vase or "music to hear, why hearest thou music sadly," in another by an Al Capp drawing or the writing of Edgar Guest. It is not a matter of taste (which is the concern of the esthete), but something much deeper, and whether there is a qualitative difference in the emotion so aroused is at least doubtful. A person who cares little for one art, whose discrimination in music, let us say, hardly goes beyond knowing the difference between "White Christmas" and "Adeste Fidelis," may get the most searching delight from and vivid feeling for flowers, or the equations of Clerk Maxwell.*

IT IS NOT EASY, therefore, to discuss what are the elements of visual satisfaction in civic art or neighborhood design. Civic art is primarily visual, although, as John Burchard has reminded us, the total impression that a city leaves with us is not just visual only but is compounded with characteristic sounds, smells and associations, with the calling of fog-horns, the odor of roasting coffee, or of slaughterhouses; with the feel of the atmosphere; with friends remembered or with loneliness. All these and many others are part of any city and of particular neighborhoods and special moments.

For no city is always and everywhere beautiful. Even those parts we admire differ in purpose, in scale, in mood; and things very similar in name differ greatly in fact. The architectural beauty of the Seine in Paris is very different from the rural beauty of the Schuylkill above the dam, neither are like the Hudson seen from Riverside Drive, yet they are all rivers flowing through cities. The Place des Vosges, Gramercy Park and Rittenhouse Square are all residential squares—yet how different the associations called up by each!

We have not, in this country, achieved any examples of great civic art, except in Washington and the Brooklyn Bridge and Rockefeller Plaza in New York. Some of the squares of Savannah almost reached the level of a provincial French town but they have been ruined; something mild can be said for Williamsburg, and the Parkway in Philadelphia is somehow not quite satisfactory. We have nothing like Place Stanislas in Nancy, or the Campodoglio in Rome or even the Cathedral square in Oaxaca. That type of formalism is not our dish. Even the classic effort of Mies van der Rohe at Illinois Tech does not come off as civic art.

In any event, great works of civic art are the

accents of a city, not the body of it. They are what make people proud of their city, but not what make a city a pleasant place in which to live. The parts of a city in which most of its inhabitants live can at best be called "humdrum," have little that can be called beautiful, are fortunate if they are positively pleasant rather than dismal. The streets of most large-city residential areas are solidly built up, consisting of rows of contiguous houses or apartment buildings. The term "urban" has come to be associated with this appearance of solidity, of a continuous architectural facade. Almost all European cities, and even most of the villages, are built in this way; and in the parts of the Continent where there are free-standing "villas," the same effect is usually achieved by high garden walls which close off the street and thus provide continuity. This, of course, is in marked contrast to the free-standing houses in our cities and suburbs, characteristically well set back from the street and wide open to the public view and the "naboring" of neighbors, dogs, cats, and children.

The urban street is capable of a very wide range of expression. It can—and does—vary from the tree-lined and stodgy Boulevard Raspail or Commonwealth Avenue to the dingy streets of South Philadelphia or Brooklyn, from the fine dignity of Bath Crescent to the rather shoddy row houses of 33rd Street across from Fairmount Park. There is the odd quaintness of Camac Street, the melancholy of Spruce Street in its brownstone garb and the zaniness of Spring Garden Street where no two blocks are alike. The ordinary older Philadelphia streets, like Poplar, for instance, retain a certain architectural quality, for all their run-down appearance, that the silly new row houses, raised on their useless grass terraces, have never achieved. The same confusion and disarray exists in all our big cities. Some, like Chicago, have never attained any quality at all. Some, like New Orleans, have a few highly concentrated spots like the Vieux Carré, or, in Boston, Louisburg Square. The question persists, why do some neighborhoods, some streets, seem so much more pleasant than others?

Small things, I suspect. The proportions of a Georgian period house, with its large windows, the stringcourses designating high stories, the broad, simple treatment of the wall surfaces, the handsome doorways, these all spell well-being and assured comfort. Their height is in good relation to the width of the street, resulting in a cornice line that is pleasing to the eye. The same things seem true in streets such as Elfreth's Alley, for instance. The houses are smaller, the windows are smaller, the floor heights obviously lower, implying, rightly, a more

* To the mathematician these are, I understand, in every sense the scientific equivalent of "and God said let there be light, and there was light."

cramped interior, the cottage rather than the mansion. Here again since their lesser height is appropriate to the narrower street, they remain in scale with people, seem "livable." Sometimes such "cottage" streets are given charm by painted shutters, flower-boxes, changes in street paving and other variations in texture that would not be suitable to the high, wide and handsome street of mansions.

SCALE—in this connection the relation of the structures to their site as well as to people—is an essential part of the problem of design. It could be the subject of an entire dissertation. I would not only point out that the high-rise building, residential or commercial, cannot be brought into human scale, nor, consequently, into scale with the conventional residence. Much esthetic difficulty arises from this, as can be seen in any city, and particularly where there has been a deliberate effort to bring the two together in one architectural group. There are many housing projects where this has been done deliberately, as well as many instances of accidental juxtaposition of high and low, that are examples of what I mean. I do not think that a happy solution is possible in terms of our present esthetic reactions. The two expressions are basically incompatible since the low building is scaled to human use and the high-rise has no scale at all, only size. The esthetics of the high-rise building, along with those of the esthetics of movement (the expressway, the thing-at-a-distance, etc.) are still rudimentary to our feeling. We are still accustomed to the static quality of "one position" architecture, with its inner relationships; whereas the basic quality of today's construction lies in its dynamism. This results in a lack of conventional scale because we must now see it relative to another element, Time. In relation to time, that is speed, conventional scale has no meaning; and it is interesting to note that most of our skyscrapers could have stories added or taken off, just as our new horizontal factories could have bays added or taken off, without any harm being done to the visual appearance or, in fact, anyone being the wiser. Furthermore such structures, seen in passing, have only absolute form, like distant hills; there is no relationship of one part to another, either of medieval ratio or classicist proportion. This obviously is not true of the architecture of the past, which contains within itself relations to itself that cannot be changed without destroying the entire composition. I can think of no high-rise building, no matter how good, to which the alteration of any dimension would in any way impair its quality.

This is what I call "human scale" and is the characteristic of structures which conform to group

needs rather than to personal ones. It derives its significance not from the individual as an individual, as in Gothic, (the Church cared for the individual soul, quite specifically), nor from the power of the personalized State—the architecture of which, at times, came quite close to the "module," as in that group Veteran's Hospital known as *Les Invalides*—but from the sociologically abstract idea of a *group* which, although composed of human beings is still not quite human.

THE DULLNESS AND MONOTONY that we associate with most city streets is primarily due to the unrelieved gridiron plan. The character of the facades which line these streets has, on the whole, very little to do with their monotony. The older portions of old-world cities are equally uniform in their facades, but they are made up of streets of varying widths, running at different angles to each other, interrupted by squares, courts, bends, salients, minor changes of many kinds. Most of these things are unintentional, they just happened; sometimes, though rarely, they are carefully planned. In either case there is no set formula, no decisive pattern to be followed. The point to be noted is that variety comes from plan, not elevation. Changes in height, which are essential to give variety to the skyline are also, basically determined by the plan of the area, i.e., they must be so placed as to be effective visually. A street like Broad Street, for instance, with its endless vista, cannot be made anything but dull; Park Avenue is another instance. But there are in Philadelphia areas in which the basic gridiron pattern has been so interrupted that there occur many kinds of variety—short blocks with dead-ends, interior parks, unexpected views and vistas, changes of pace because of happily nonconforming uses, old houses mixed with new, and so on—and even, although rapidly disappearing, brick sidewalks and gas lamps. This kind of variety is what the planner talks about wanting to do; these Philadelphia neighborhoods are in effect residential super-blocks, with no through traffic, so that these pleasant places are only to be appreciated on foot.

This old idea of the city, which is based on the compactness required by pedestrian circulation, the need for gregariousness, the feeling of security engendered by neighbor-closeness, has pretty well disappeared. As an increasingly rootless people we are getting to realize the American Dream of to each his own house, just like everybody else's, and with the same mortgage—for the ideal of home-ownership is more honored by the bond than by the deed. The Dream started long ago, in a country that was on the whole secure, once the Indians had been exterminated, needing no walls for protection. Philadelphia,

New Haven, Savannah, the outpost towns in the Western Reserve were all laid out on the premise of the individual and separate house on a large lot of its own, often complete with small orchard and garden. The closely-built city came about not so much because it was wanted as because it was an economic and demographic necessity. As we all know, it is the automobile and allied technological developments that make possible at last the structural fragmentation of the city.

In the process we have lost, at least for the time being, the essence of urban architecture, and with it has gone the old type of civic art. The urban fringe and the subdivision consist almost entirely of free-standing houses, plopped down helter-skelter on the land. They cannot, almost by definition, be made to have visual significance as an architectural composition. Individually they may have charm, but a hundred or so houses of charm are likely to become cloying, let us say. Where the street scene does have charm, it is not due to the structures but to the foliage, for even Washington looks better in summer than in winter. In general, the houses do not have charm, and the treeless streets are dreary. One looks from one house to another, each at a time, and if they look alike they are monotonous and if they are all different one is depressed by their banality. There is no possibility of architectural composition, in which the focus is on the whole and not on the fragment, because there are no architectural elements that can achieve esthetic significance.

The one possible esthetic base to the fragmented subdivision could be the sensitive adjustment of houses to the land, and the interspersing of grouped houses, garden apartments, shops and other architectural variations. A little book by Thomas Sharp, "The Anatomy of the Village" (as well as others of his) gives some excellent examples. Frederick Gibberd, whose book "Town Design" is almost the only good technical treatise on the esthetics of siting * that I know, has this to say: "The buildings and other objects are placed in the topography, which modifies their forms and is modified by them. As we have suggested, the first major problem in town building is to establish a satisfactory relationship between the natural forms of the land and the geometric forms of the buildings placed on them. This relationship may tend to harmonize the geometric with the natural forms by bringing them in sympathy with each other, or it may dramatize them by bringing them into conflict; but whatever the esthetic treatment, its basis is the recognition of the

formal qualities of the landscape itself." (Qualities which our subdividers recognize with the bull-dozer.)

IT SEEMS TO ME that the formlessness of our vast new residential areas is for the most part inevitable under present conditions. Moreover, it is reinforced by absurd subdivision regulations which increase fragmentation, such, for example, as forty or even sixty foot wide black-top paving with curbs and deep set-backs which throw the little houses still more out of relation to each other. Nor does present "compartmented" zoning practice help. And, as so often, we seek to enact by law what can come only from the heart, to legislate beauty, to establish it by censorship, as though that were possible, when what is needed is for somebody in practice to really give just one small damn.

Unification of the new communities will have to come in new ways. It is probable that the innate need for esthetic satisfaction will evolve a new "esthetics" which will in time have none of the classical qualities of our present concepts. Esthetic satisfaction changes with the material expression of new techniques and social adjustment to them. We see and hear differently from contemporary Chinese or our Victorian forebears, to say nothing of ancient Greeks. We are so enmeshed in customary and static ideas of what constitutes civic art that we are aghast at what is going on around us, although we have accommodated ourselves, to a fair extent, to considerably greater changes in architecture.

The truth is, we have as yet no good examples of what the new town-scape will be, only indications and trends, such as the highways and free-ways. These great ribbons of concrete, with their handsome bridges and interchanges curving over the countryside, give a continuity to the landscape, a sense of design and purpose, of a dynamic which makes the exploded houses seem even more trivial.

This process of fragmentation is taking place in the cities also. It is most noticeable in the central business districts. Business and shopping streets, lined with stores and buildings in continuous frontages, are breaking up into groups of tall buildings surrounded by parked cars, or in the suburbs into inward facing shopping centers. The resultant esthetic problem of what to do with the sea of cars has not been solved, even though years ago the Country Club development of Kansas City tried lowering the parking lots and putting low walls and planting at sidewalk level. In most places the brightly colored cars are more pleasant to look at than the shoddy stores. Victor Gruen's much publicized plan for Fort Worth carries on his experience with Northland, but it remains to be seen whether

* Camillo Sitte's *The Art of Building Cities* is analytical but not technical, and concerns itself with Civic Art rather than the more intimate scale of the neighborhood.

the esthetic results, so brilliant in the new shopping center, can be carried over into the revision of an old district. Louis Kahn's forceful proposals for downtown Philadelphia go so far into the field of new and dazzling architectural remodeling of a drab business district that it is almost certain nothing will be done about it.

Many cities are being cut up by new highways, some depressed, some elevated, some on the level. Seldom has any attention been paid to the character of the wound that they make, to the future relationship of buildings to the wide swathe left by the right of way, to the great unoccupied acreage of the interchanges left desolate in the midst of the city. Again, while these are the sources of new beauty, they remain, as of now, potential rather than actual.

This failure to seize opportunity is calamitous. Not a single urban renewal proposal has shown the slightest trace of imagination or even—except in the smallest, most particular “project” sense—any concern with either new forces or present appearance. They are dull, every one. Nor is Europe doing better. The much touted Berlin “architectural exhibit” is just that and nothing more, a show-case of the New Eclecticism.

The only plan I know of that has sought to meet these problems of time, space and motion head on is Lucian Costa's brilliant schema for the new capital of Brazil. Here the imperatives of swift traffic,

of concentrated urban work and entertainment, of quiet living are, for the first time, given clear esthetic expression both graphically and theoretically. Not since Radburn has there been anything of such significance.

The production of a pleasant environment, to say nothing of a beautiful one, or of fine civic art, does not come about by chance or by law. It comes about because somebody really cares about creating something. The creation of the great work of art is the result of dedicated passion. No one expects great works of art for a civic environment: they stir the blood and are difficult to live with. But even the pleasant things require love and interest to come into being, if they are to give pride to those who live in them. Besides somebody to create there must be somebody to appreciate. The sense of civic art, of environmental beauty, has become pretty well atrophied. It will take more than a few years, it will take great effort by the architects, to revive it. At the moment we are evolving. We have the high-speed dynamic and the pedestrian enclave and, in between, illiterate fragmentation. Hence in the future, I believe, there will be two kinds of architectural (and perhaps this will be so in the other arts, too) forces to be expressed: the enormous design for motion, on the ground and in the air; and, for living and peaceful dying, the small design of things cared for and at rest.

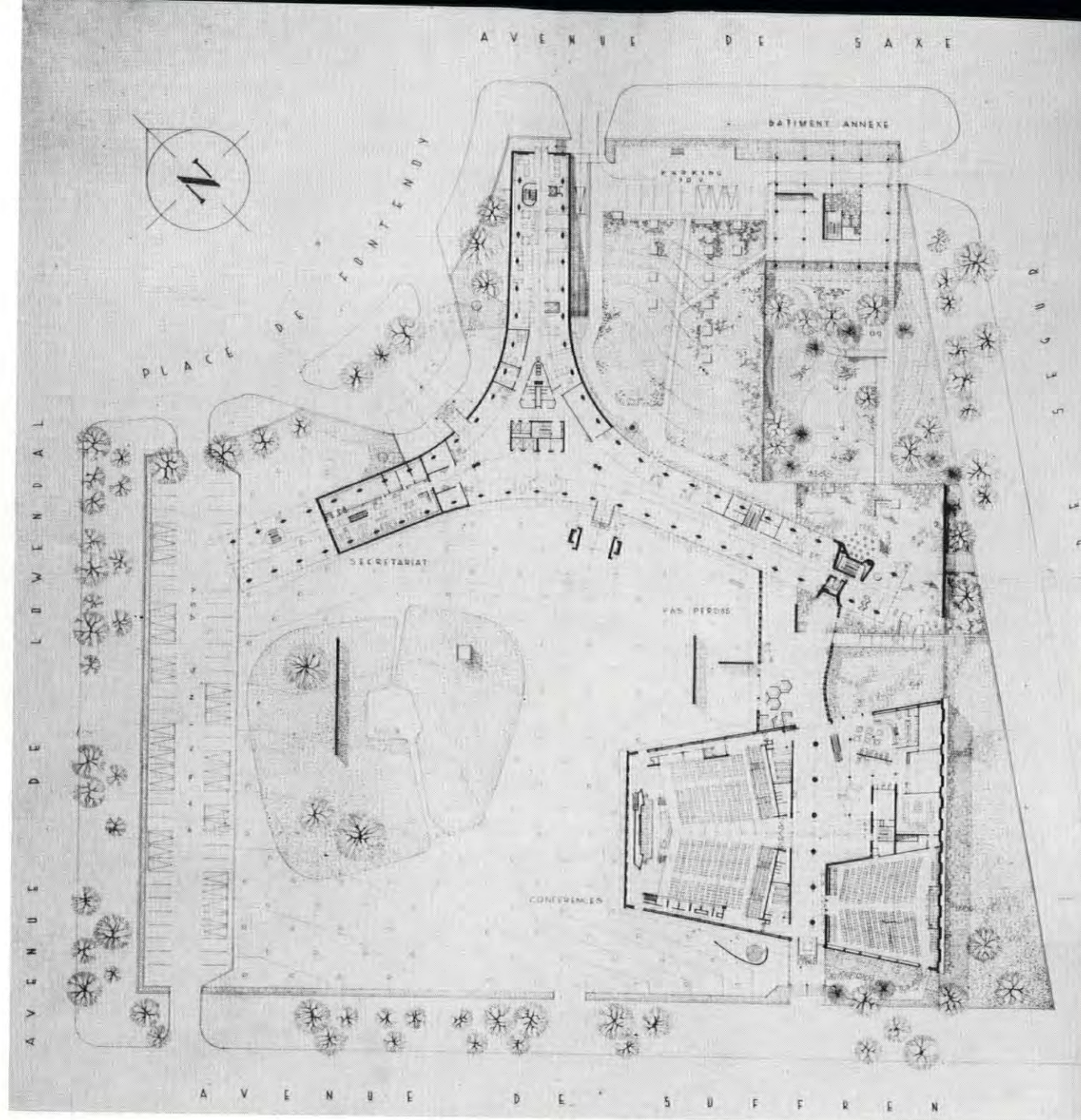
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THE EXTREMELY RARE photograph shown at left is a close-up of the statue of Christopher Columbus on top of the column in the center of Columbus Circle in New York City.

A copy of this photograph was presented to the British Royal Family in a gift album compiled by the British Photographic Societies.

The photographer is Aloysius Schuszler AIA, of Cleveland, Ohio.



FAVORITE FEATURES OF RECENTLY ELECTED FELLOWS

26

MARCEL BREUER, FAIA

Permanent Headquarters Building for UNESCO—Paris, France

Marcel Breuer, Architect

Bernard Zehruss, Architect

Pier Luigi Nervi, Structural Engineer

A VIEW FROM THE SOUTH EAST OF THE
END WALL OF THE CONFERENCE BUILDING
AND SOUTH FACADE OF OFFICE BUILDING



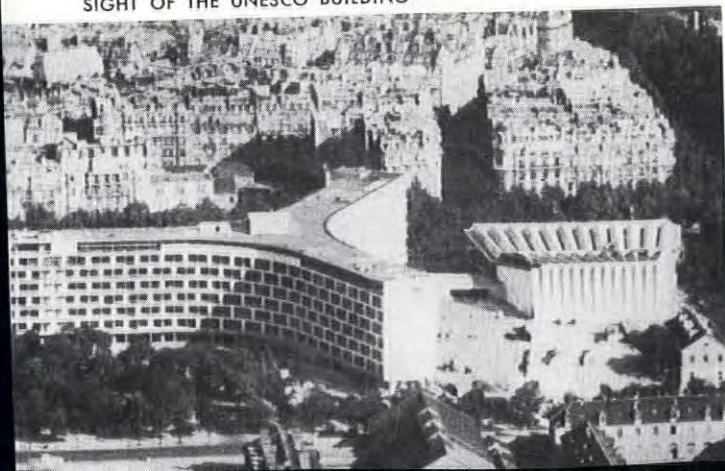
FACADE OF THE SALLE DES PAS PERDUS
AND THE SECRETARIAT, AND A VIEW OF
THE FIRST FLOOR OF THE CONFERENCE HALL.



SOUTH CORNER OF THE CONFERENCE BUILDING



A VIEW FROM THE EIFFEL TOWER OF THE
SIGHT OF THE UNESCO BUILDING



From the Executive Director's Desk:



Cameramen, Inc.

A WHILE AGO, prompted by the imp of ribaldry, I set down my experiences in the acquisition of a house in Georgetown and the events leading up and somewhat through the production of architectural service necessary to making it suitably habitable for my wife and myself. The article which appeared in the June number of the *Journal* evoked, as I had hoped, a pleasant smile or two, confession of merriment, a smidgin of fan mail, one slap on the back, and as I had not hoped but feared, criticism.

It was conveyed to me by word of mouth, second or third hand, that a dignified member of the Institute had found my offering to be flip, not flip-pant, but flip. Now flip is a fascinating word. It harks back to my childhood when its indiscreet employment could and often did result in black eyes and bloody noses. "Hey kid, you're too flip" was an instant challenge to take off your coat, roll up your sleeves, double your fists and start to go to work on your accoster, coming out for better or worse, depending on the size of your adversary and his skill or lack of it in the gentle art of juvenile mayhem. Flip was a word frowned upon in my father's household.

There were other seemingly innocuous phrases that were banned in my family, though even today I cannot understand quite why. One of them I recall was "twenty-three skidoo," a rather rude invitation to vacate the premises. I think my father, who adored Dickens and looked upon any even remote desecration of his favored author as heresy, somehow associated the vulgar expression with Sidney Carton's number on the way to the scaffold in the "Tale of Two Cities." There were also the fascinating then mild obscenities, "oh, you kid" and "oh, you chicken." Utterance of these was daring in the extreme, at least within the walls of our family's house.

But to get back to flip, a word which may be an adjective, an adverb, a verb and a noun, either common or proper. I recall there was a clown in France named Flip and also a character in the comics, though my acquaintance with him was surreptitious (comics were banned in our house, a restriction which led to my present absorption in them. I start with Dick Tracy and sometimes am able to work up to and even through Walter Lippman before I have to leave for the Octagon).

Flip used as a common, or I might say uncommon noun, recalls a pleasant occasion not entirely disassociated with architecture. In the spring of 1918, after I had been a year on the Western Front, during which my life consisted of days of boredom punctuated by moments of extreme fear, comforted however by the comradeship that any soldier enjoys who has with his companions survived discomfort, dirt, adventure and mortal peril. My commanding officer decided to let me go to the leave center of the American expeditionary force then at Aix-les-Bains. I thought at the time that the leave was a tribute to my heroism. It was not until some years later after I had returned from France that I learned that all my C.O. wanted to do was to get me out of his hair for as long as possible, which unfortunately for him, was just seven days.

We were then in a northerly part of the line with a French army temporarily stationed in a British sector. My orders called for me to take the leave train from the British railhead and by-pass Paris, a city which I had no intention of by-passing if I could possibly avoid doing so. It was all much easier than I had thought. I entered the right side of the leave train, walked through one railroad carriage and out the other side, crossing the tracks in the rail yard until I found a friendly French train crew who pointed the Paris express out to me. I

entered that train on the wrong side and stayed out of sight until after it had gotten well underway and until after the guards and the M.P.'s had made their rounds. For some inexplicable reason I had no trouble when we got to Paris. I simply fell in with a detachment of American soldiers marching through the railroad barrier and parted company from them as soon as I figured my escort had served its purpose.

I straightway looked up Tom Cope, now AIA, and a valiant worker in the Institute field, who was then engaged in rehabilitation work with headquarters in Paris. He apparently thought that rehabilitation should be extended to my person for he was impressed neither with my heroic appearance nor my exploit. His sole suggestion was that a Turkish bath would do me no harm. He even accompanied me to Hamman's, I suspect to be sure that I carried the assignment through to the bitter end.

It was my first and only experience in one of those institutions. I did not realize how debilitating it was going to be. It was, in fact, supremely enervating, so much so that when it was over and we teetered out of the door it was obvious that a visit to a first-aid station was essential. We found one close by. Interestingly enough, it was called Footits Bar. It was a proper first-aid station with chairs and tables on the sidewalk, an awning, an intern in a worn black coat, a soiled shirt, a soiled apron and sporting a drooping mustache. We identified him as an intern through the numbered disk in his buttonhole. He sat us in chairs and after hearing our symptoms and after consultation with the surgeon in charge who stood behind the operating table but in front of the great open-shelf medicine cabinet with its array of bottles with colorful labels, Porto flips were prescribed. Having encountered in the past year nothing more enticing than *pinard* and *ginole*, the Porto flip was pure ambrosia. I think the drugs and medicines used were eggs, sugar, cream and port wine. We were refreshed but not completely so we had another and then another. (I must remind you that in those days I was so slim that on enlisting, the Army debated whether or not I was too willowy for the rigors of military life.)

Well, here we were, two architectural students whose student days had been stopped mid-way by a war. So it occurred to both of us sitting there in that salubrious setting that someday the war might be over and we would be setting out to become architects and perhaps a little research on the subject would do us no harm. The Porto flips must have put the spirit of adventure into us for this time we decided to by-pass Paris and go further afield. Paris was just too easy at the moment. Versailles beckoned for it promised travel and glamor to say

nothing of beauty, romance and the grand plan. We caught the trolley to Versailles, walked through the great gates, through the courtyard, through the palace and stood on the terrace looking down on the *tapis vert* past the great fountains to the canal. The day was gorgeous, a blue sky flecked with clouds, a soft breeze, the gardens were not crowded, the shade of the trees was inviting, so we thought what could be better than a picnic lunch by the side of the canal preparatory to carrying on the arduous architectural research in the palace itself. Before we had taken the trolley, we had, suspecting that we would be hungry at some time, provided ourselves with bread, sausage, cheese, and a bottle of wine.

It was lovely walking dreamily down the steps and down the grade to the canal. We came upon an ancient woman renting boats. Business was poor, I think we were her only customers, so we hired a row boat and embarked toward the "Ewigkeit" at the end of the Versailles vista. The voyage was longer than we thought and before we reached the end of the rainbow we pulled to shore, took the boat's painter and laid it on the grass, evidencing a singular faith in the adhesive qualities of both the painter and the grass.

We attacked the food and drink politely but in a determined fashion and then somehow or other we were overcome with lassitude. Was it the beauty of the place or could it have been the ghost of the past? We laid down. Just as our eyes were closing a puff of wind blew the boat off into the lagoon, thus destroying our faith in our too simple mooring arrangements. As it drifted all too swiftly down the watery monument, Tom and I, with prompting from no one, uttered simultaneously and dreamily, "The hell with it."

Later, much later, we awoke and recalling our determination to carry out architectural research, stood up and looked up the terraces toward the palace. It was a beautiful sight. The setting sun at the far end in the woods was casting a sort of *Alpsnglüh* over the edifice, creating a color effect I would gather seldom seen by anyone not excepting the grand monarch. As the glow faded, the palace took on a closed and forbidding look. We knew we would not be welcomed so we slipped out through the side gate, took the trolley back to Paris and put off architectural studies, as it turned out in my case, until after the Armistice.

It's really somehow sinister how a little word like flip and one of its meanings, can divert one from the announced intention of reporting further on the Georgetown building operations, and even from the pursuit of architecture. It might be well however to postpone the final report on the Georgetown

venture until after we have installed ourselves in the house and have had time to live with our errors of omission and commission.

There are times when *divertissement* has a salutary effect. Sometimes I cannot refrain from engaging in it, an aberration encouraged by some of the readers in the *Journal* both here and abroad.

I learned early, when the editor asked me to provide a monthly column, that the temptation to pontificate must be resisted. I do enough preaching and exhorting when I go to regional conferences,

state association meetings, and other component gatherings. Reports on the state of the profession of the Institute and of the nation can best be given orally. When they must be prepared sixty days before publication, the content is obviously going to be obsolete. There are activities and concerns of the Institute with which I fear the membership is not too well acquainted. I shall do a series on these interspersed with occasional items of nostalgia, aspiration or entertainment and I trust you will indulge me.

EDMUND R. PURVES

The New York Times.

THE NEW YORK TIMES, WEDNESDAY, JULY 2, 1958

Topics

Twenty-first Century Architecture In a rapidly changing world, alive with possibilities, it is an amusing pastime to conjure up visions of

the future. What will things be like in the year 2000, for example? The question sets the mind free to wander in fields of imagination. The optimist sees the image of a shining utopia, where man's rational powers have finally succeeded in overcoming the darker forces of his own perversity. Another less cheerful dreamer sees perhaps an Orwellian or Huxleyan future in which political and technological trends have led irresistibly to the creation of one all-perfect state and one perfectly miserable citizenry. Happily for the optimistic school of thought, eight editors of architectural, engineering and construction magazines made a hopeful prediction recently in Washington. The editors envision a splendid functional future for architecture in the year 2000. But their forecast has none of the imaginative excesses of science fiction. It is quite believable.

Highway Upon Highway One of the structural wonders we may anticipate, according to these authorities, is the double-decker highway between cities—one tier for cars and another for trucks. Gone will be the days when a line of passenger cars had to creep along in frustration behind a huge tractor-trailer lumbering up a narrow mountain road. And truckers,

always annoyed with the antics of careless and inconsiderate motorists whipping in and out without warning, will ride in aloof isolation from such non-professional drivers.

The Passing of the Skyscraper

The city of tomorrow, the experts tell us, will not be forested with skyscrapers. Instead, the skyline will consist of low, wide buildings, adorned with landscaped courts. No longer will the sheer walls of seventy-story buildings loom over the small human figure in the street, leaving him with an abiding sense of insignificance. The man walking down the street of the future will probably be treated to a glimpse of trees, lawns and flowers—all in pleasing, nongigantic proportions.

Traffic Jams Only A Memory

The final, perfecting touch to this picture of urban paradise will be the city streets themselves. No more will the public ear be offended by the sounding of auto horns, the whine of rubber tires on asphalt, the roar of engines and the occasional grind of fender on fender. It is predicted that all buses and automobiles will travel underground or on elevated roads. The streets will be completely free of motor traffic. People will be able to promenade down the middle of Broadway or Fifth Avenue at any time of the day. The city thoroughfares, long dominated by the internal combustion engine, will revert to their original and rightful owner

—the humble pedestrian. And old-timers will no doubt tell their children strange tales of ancient tribulations in the early days of the city. They will describe graphically such hardships of the past as the "traffic jam" (they used to have cars coming together from all directions right here, pointing to Times Square or the corner of Fifth Avenue and Forty-second Street). And the "traffic signal" (they had these different colored lights to keep the cars from running into each other, though nobody paid much attention to the lights, and there were accidents all the time).

So Little Time The documents containing these and other predictions made by the editors now lie safely ensconced in the cornerstone of the headquarters building of the Associated General Contractors of America, where they were sealed by Vice President Nixon. There they will remain until the turn of the century. Then, if all goes according to plan, a group of notables will gather sometime after Jan. 1, 2000, and proceed down to the AGCA building to have a look at the auguries of 1958. Will they find the predictions remarkably conservative when compared to the actual state of things in their atomically powered twenty-first century Garden of Eden? Or will they read the forecast and quickly concur that the editors expected perhaps too much too soon? Their remarks may be much closer to the latter judgment. After all, there is a lot to be done—and only forty-two years in which to do it.

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THE ARCHITECT AND THE PACKAGE DEAL

W. A. WATSON

Reprinted from the May 1958, issue of the Journal of the RAIC

THE STUDENT OF ARCHITECTURE has before him almost invariably, the ambition to establish a practice of his own in which he will attain fame and fortune or to become a member of an established firm that will permit him to achieve similar ends. His whole training has been in this direction—to have an enlightened clientele, to know the thrill of developing a competent plan expressed by an exterior of distinction, to watch the day-by-day growth of a project at the site, eventually to turn over to the owner a structure in which the owner, architect and contractor can feel pride. A concurrent interest and concern in all of this is a monetary return, the profit motive, which almost everyone must consider in a land where inherited wealth is rare.

However, when the status of "Architect" is reached, not everybody, for one reason or another, goes into private practice. Many take positions in departments of government, at any of the three levels, municipal, provincial or federal; many others enter the employ of banks and other great institutions—all of these salaried architects are in positions of great responsibility and importance. To many of these we owe a very great deal, not only for their personal successes as architects, but also for the recognition of our profession, which they have fostered.

There is still another group of architects—those who enter the employ of building contractors, a possibility in every province of Canada except Quebec, where an architect is prohibited by the Code of Ethics of the PQAA of Ethics, to be a member of a builder's staff. Such employment permits builders to offer the public a complete "Package Deal" which includes architect's services as well as engineering design and the actual construction of the building. Competitive bidding is ruled out. The architect, however free he may be in design, is actually the employee of the contractor, a position which could easily deprive him of freedom of action and decision as an arbiter between the owner and his employer. In fact he ceases to be an arbiter, and in the eyes of many, he ceases to be an architect.

The Committee on Professional Ethics recently polled the members of the Ontario Association of Architects on this question—"Do you consider it unethical for an architect to be a partner or employee

of a package deal contractor?" "Yes" answers were 63.3 per cent; "No" answers were 20.8 per cent with the remainder undecided or conditional. Many architects were very outspoken in their disapproval and one such comment follows:

"The architect who participates in a 'package deal' may be making the best possible use of his knowledge and skill to produce a building for the purpose intended and his actions could be considered quite ethical in that regard. But he has allied his interest to that of the builder rather than the client, and is, in fact, prostituting his professional status and devaluing the prestige of the profession as a whole. The OAA should prohibit participation in 'package deals' by its members."

Another commented "The architect must remain the client's representative and agent, acting for him and being free from financial commitment in the project. This is impossible in the package deal. The Association should set a high standard, and its members a high example, and should make offenders aware of the harm they are doing to the profession."

To foster a high standard of ethics and to impress on newly registered architects the fact that they are entering a profession learned and dignified, induction ceremonies are now held in the Province of Ontario. The chairman of the Registration Board or some other eminent architect meets the new members in the OAA building for the presentation of Certificates and Seals, at which time proper professional conduct and ethics are stressed.

There is a definite place for the architect in the promotion of building projects on which the owner, the architect and the contractor collaborate to work out a scheme from its inception and where the architect can hold his proper professional standards. It is essential that the architect adhere firmly to the fee schedule.

Whatever may be the case in other parts of the world, certainly the Canadian concept of an architect views him as acting on behalf of a client in the design of a project, the selection of a contractor by tendering, and the impartial supervision of the construction. Variations in this pattern occur, but experience has shown that this procedure works admirably in cost cases.

New Criteria for New Forms

DR. THEODORE A. GILL

*Dr. Gill is a Lutheran clergyman and
Managing Editor of The Christian Century,
from which this article is reprinted.*

THERE ARE THOSE who would as readily believe that Gibraltar was floating lightly out to sea as that the Lutheran Church—Missouri Synod, was up to something radical in Indiana. Missouri Synod? Hardly. *Indiana?* Unthinkable. Missouri Synod radical in Indiana? Never! But as surely as the rock stands still in Spain those notably conservative Christians are building daringly, inventively, radically in that reputedly reactionary state.

According to Chicago theologian Jaroslav Pelikan it was the attendants at filling stations on the highways sweeping around the Missouri Synod's Valparaiso University who first noticed what a novelty was being visited upon Indiana. And they were not impressed. Nor was this just Philistine reticence. Initiates who knew the plans for Valpo's new chapel could never have dreamed what a marvel the great building would be. Architect Charles Stade himself is hushed when he stands now by his vision taken shape beyond his hoping. So who could blame the service station men when they snorted at the squat silo that came first, and then in front of that a roof beyond imagining for size with eighteen (!) weirdly angled walls stuck around under it, and a tower that had to be seen to be believed looming up before all.

unsophisticated it moved swiftly from being the object of present judgment to being a new criterion for future judgments. And this is the mark of any successful invention in any of the arts.

It is hard now to imagine anyone not being moved by the nearly completed chapel. Set on a rise with the old campus at its back, and falling away before it the long meadows on which the new campus will be built, the huge chapel is the crux and the crown of the church's university. The size of the structure alone is almost overwhelming. Built to seat congregations or audiences—for the building is also the school's auditorium—of 3,200 people, the enormous length and breadth of the chapel demands measurement in America's favorite unit: the number of football games that could be played on its floor (or in its balconies, for that matter). There is even a suspicion that there may be members of that academic community who could attest the figure experientially! If so, I can't think of a story old Martin Luther would have enjoyed more.

But size barely begins to account for the impression the place makes. It is the design that dominates. And how to put in words architectural lines that hardly stand still in stone? The long walls of the nave are not walls at all but nine brick cliffs lined up on each side of the nave. These sections are not end to end but are identically angled, with the chancel (upper) end of each turned into the church and the lower end of each turned out. Glass panels join the inside end of each brick wall to the outside end of the next. The novelty makes description difficult, but if a child drew a Christmas tree in the immemorial child's way, but with no taper to the top, that would be a crude pattern of the great nave. The bottom strokes on each branch would be the glass panels, and the top strokes the brick walls.

Seeing Is Believing

But the proof of the chapel's art is in the gas merchants' present attitudes. They like it. The strangeness to which they first reacted with such suspicion turned out to be only strangeness, not the offense they feared. Because they were good, true shapes the new shapes that startled with their unfamiliarity shortly settled smoothly into the fresh molds they fashioned for themselves in the mind's eye. The building is beautiful, and so even for the

Heavenly Drama in Detail

These serrated walls march down a tremendous floor to the chancel. Or do they begin from the chancel? Certainly, as the chapel dominates the campus, the chancel dominates—but without minimizing for a moment—the chapel. A great octagon of narrow stone piers and soaring glass panels, the chancel cores space for more than a hundred feet of heavenward thrust. A long flight of wide, curving steps sweeps up from the chapel floor to the much higher circle of the chancel floor. Outside, the gently sloping chapel roof meets the steeply angled V-gables and the deep V-gouges of the chancel roof that result when eight sides convolute toward dramatically pitched tops.

Beyond size and design, there is the detail: the ingenious ideas, the felicitous inventions, the adorning of the parts, the happy accidents, the workmanship. These are everywhere. The fluted ceiling of the chancel, immaculate white plaster converging high overhead to a pencil-point and ineffability; the stone work, perfection in its grading, spacing, proportion; the brickwork, “each brick,” says the university’s professor of engineering, “kissed into place”; the chancel stairs themselves, a *scala paradiso* anytime, risers for a chorus sometime; the main staircase to the sacred balcony, steps cantilevered in a clean spiral up the walls of the circular baptistry at the rear of the church; the spreading narthex with its patterned brick floor; the guild chapel below the chancel floor; those chancel windows. And there are many more to come: the altar, the pulpit, the organ, the furniture.

Waves of Motion

Also to be anticipated are the walks and drive-ways now being drawn around the chapel by the architectural consultant to the university, Jean Labatut, head of the graduate school of architecture at Princeton University. Integrating the useful elements on the old campus with the new campus, Dr. Labatut’s paving and planting will emphasize here and screen out there. He has a fine and fairly new student union building, Finnish as a *sauna*, to accent; some interesting hexagonal dormitories on stems to feature; some serviceable Gothic dormitories to save; and a brand new, embarrassingly “contemporary” dormitory for the demure deaconesses which will need the biggest fig leaf of all.

But midway of everything is that splendid chapel, that moving chapel. Moving not just by its effectiveness but in its effect of motion. For the huge structure has no heaviness in it, and its lines all move. The straight line of the chapel roof slants differently against the sky while you watch. From

inside, the nave walls taper in to the chancel. From outside, they taper out to the chancel. In fact, they do not taper at all. The serried tiers of walls lap each other like waves. There is movement in conception and in sight. An immense vigor is set in a vaster repose.

Only one element flaws the dream. From inside, it might never be noticed. But looking at the chapel from outside the back (the important entry end), it is clear that someone has mischievously blighted the original beauty of the building. For from the back the brick side walls of the chapel are little seen, but the glass panels are everything. In a flash you know that the enormous brick wall at the back has to be a mistake. It was no part of that first vision which saw on this hill a great house of light and air, a dream poised between the masonry cliffs of those walls that are and are not there, the whole anchored to this grateful earth by the triumphantly angled chancel roof.

A House for Worship

Of course the back wall was meant to be glass. The reason for the change is hard to come by, for it is swaddled in the embarrassments and aggravations of Christian campus machinations. Apparently, though, the musicians boobed things. Artists that they are, they could not yield another artist his whole creation. Furious as they would be at a painter’s altering their compositions, they didn’t hesitate to coerce the architect in his. Music evidently has to come from the back and be bounced off brick, so brick it is at the back, and why should one art give a hoot about another? It is a shameful thing when everyone else is taking a chance on creation that some *vocational* creators should insist on the usual ways—their ways—and not join the exciting quest for new solutions. Fortunately, architects continue respectful of the musician’s art.

But with all that behind you, here will be a house for worship: for liturgical worship when a blazing chancel is the focus, for a glorying in creation when the darkened chancel embraces and sustains performances on the steps become a bright stage in front—the church dark but *there*, behind the music and the drama. And after each benediction or bowing, thousands of students emptying the building in minutes by doors at the ends of every few pew rows.

THE DESIGN of Eero Saarinen and his associates for the Concordia Senior College campus at Fort Wayne may be better known than Stade’s Valparaiso chapel, and so may need less description. A prizewinner last year, the master plan and its fulfillment is another prime example of architecture that makes a new, good thing by beginning at the beginning.

The Senior College gathers preministerial students from the Missouri Synod's seven junior colleges to get the men ready for seminary. Without commenting on the ultimate wisdom of making ministers somehow special and "different" even before the parish gets its licks in, observers, as the architects did, must accept the place's intention. The aim was a campus where Christian individuals could know themselves and where Christian community could grow—where men could get next to themselves and to each other.

Mr. Saarinen has therefore laid out a village with cells. The students' solitariness is arranged for in carefully decentralized dormitories, two students to a room, four rooms to a section in the intricately split-level houses that separate five such units under one roof. Thirty-four men will live in each house, with extra rooms for lounge and hermetically sealed study (for when roommates get rowdy!) in each. These dormitory houses are built in groups of four around the edges of the close-knit campus.

Old-World Image Made New

It is as you move in toward the center of the campus that genius and glory begin to glow. Actually, the marvelously contrived dormitories, thoughtful and analytic as they are, and efficient and comfortable as they obviously will be, do not quite come off. It is as if the closer you get to designing and arranging for human intimacy and isolation, the more impenetrable the protective thickets so rank around the self. Something about the spirit resists structure—even structure to its own advantage. One wonders whether even a Saarinen might not on occasion be so cerebral that he inhibits the spontaneity of his creation. For whatever reason, the starkness of the scattered living units is a disappointment. As buildings they are remarkably uninteresting, even drear. Bring on Jean Labatut with his shrubbery.*

But even the dormitories have importance in their contribution to the mass. Their roofs help create that clustered village which is the Old-World image for the campus. Saarinen found inspiration in an old drawing of the early German moor village of Aichbuehl. The significance of the model or symbol is not to be overstressed in architecture any more than in any other art, of course. Prior to a specific suggestion's being acted upon is the significance of the artist's susceptibility to just that particular suggestion. It is the artist's understanding of the prob-

lems to be solved and his creative sense of general possibilities which act decisively in subsequent selection among available models, images, symbols.

So Saarinen, having studied the job to be done, knowing the land to be occupied and the sky to be invaded, found suggestion in ancient Aichbuehl. The appropriate concept being the village, from Aichbuehl came the pitch and rhythm of roofs, all originally oriented the same way for resistance to nature, now oriented the same way for the unity and integrity of community design.

'Strong Against the Sky'

Symbol and center of the whole is the chapel, great roof pitched very steep and very high, eaves almost to the ground. Approaching the campus from the front, the mighty tent-shape brings eye and view to focus. From anywhere on the campus, looking toward the sides of the church, the vast black slabs of the roof are background to every vista. In the shelter of the central church, grouped around the little town square, classroom and administration buildings, union, refectory and library make the village. The close-grouped, identically pitched dark tile, all angled the same way, look as the architect guessed they would, "strong against the white sky. It is the same kind of white winter you see in northern Europe."

But if the layout is soberly impressive, it is inside details that engage and delight. The long classroom building features a full-length hallway down one side of the building, the outside of striking sealed brick lattice-work looking onto the village green, all classrooms opening off the inner side. And such classrooms: a beautifully grained table on the floor level tapers back into the room. At the wide head sits the teacher; thirteen students are seated around the other three sides. Then, just behind those thirteen students, the floor level rises three steps and eighteen more observing students sit at a long desk that curves around the table below. It is a good cross between the Guarantee Trust board room and the Grail scene in *Parsifal*—and learning there looks irresistible.

The same classroom building features one of several memorably eccentric staircases with their wedged cantilevers and curiously bent bannisters. The great free-standing fireplace in the middle of the student lounge is no more to be forgotten than the mighty flues that sweep from hearth to ceiling. There are the beautiful new diamond bricks used everywhere, the specially made dark tile, the flexibility of dining spaces, the beseeching comfort of library nooks. Everywhere, everywhere details to delight and beguile.

* To this comment, Concordia Senior College replies: "Apparently Dr. Gill is under the impression that no provisions have been made for landscaping the campus. Actually we have more than \$100,000 in the budget for this purpose. Naturally, the landscaping has not been completed because construction is still going on."

To Your Knees!

And then the inside of the chapel to floor you. Blundering in from the bright day outside, the unsuspecting spirit is clubbed to its knees by serenity. Under its hugely peaking, scarcely pierced ceiling, the nave with its present clutter of new furniture and the yet crated Schlicker organ (*Nicht werfen! Nicht stürzen!*) is dusky. Only the broad chancel is radiant under the single long panel of glass that is fit into the roof just over it. Suddenly you are back in Minneapolis in the Christ Lutheran Church of Saarinen *père*, with its subtle illuminations. The massive, single-slab marble altar, unadorned, severely squared, glows under its private sky. The great slender cross looms in its own shadow from the high triangle of the back wall. Light, textures, proportions, all make a palpable awe, real enough almost

to touch but too contingent to pocket. Once seen, this is a church always to be lonesome for.

Certainly so high a point disarms criticism. What if the campus is a little dreamy, a little make-believe? What if, forest-moated, it seems a little remote for perministerial students? What if there is a hint of homely row houses about the dormitories? What if the architect was guilty of silly flummery in pointing out that the chapel roof, pitched 23.5 degrees from the vertical, has the same pitch as the world's axis against the sun—a strictly freshman-course statistic utterly irrelevant to this structure? Here is a whole campus that began at the beginning, that may occasionally have been almost too hard-thought, but that stands now in resonant beauty, his creatures' graceful adornment of the Creator's gracious creation.



CED'S Interest in Cities

NATHANIEL A. OWINGS, FAIA

Of great significance to the architectural profession is the fact that the nation's outstanding organization of leading businessmen and scholars has turned its attention to the economic problems of America's cities. CED's Area Development Program is currently engaged in work which could have far-reaching influence. Mr. Owings reports on the new project based upon his knowledge of the Committee for Economic Development and the work of its Trustees.

THE SUBJECT OF CITIES and the state of our urban concentrations in the United States is one which has been marked by increased research and study in recent years, and is certainly of obvious and vital concern to the architectural profession.

The growth of our urban-metropolitan areas has not been an unmixed blessing. With the growth has come a host of problems about which much has been written—congestion, blight, transportation crises, etc.—but with these problems have also come new questions as to the kinds of economic functions which can best be performed in our cities, and the kinds of decisions that are going to have to be made if our urban centers are to retain the growth and vitality necessary for future economic development.

Interest in the economic problems of cities and our future growth has received new emphasis

with the initiation of an area development program by the Committee for Economic Development. CED, as it is generally known, is a privately financed group of 150 leading businessmen and educators, devoted to the following objectives: (1) To develop, through objective research and discussion, findings and recommendations for business and public policy which will contribute to the preservation and strengthening of our free society, and to the maintenance of high employment, increasing productivity and living standards, greater economic stability and greater opportunity for all our people; and (2) to bring about increasing public understanding of the importance of these objectives and ways they can be achieved.

Chosen for their individual capacities rather than their individual interests, the Trustees of CED, who are generally presidents or board chairmen of

corporations and presidents of universities, unite scholarship with business judgment and experience in analyzing issues and developing recommendations to resolve the economic problems which constantly arise in a dynamic and democratic society.

While perhaps best known for its policy statements on national economic issues (for example, "Defense Against Inflation," "Economic Growth in the United States," "Toward a Realistic Farm Program," "The Problem of National Security," etc.), the interests of CED extend to all phases of the economy, including regional and local economic issues.

As a new program of CED, the Area Development Division's work began about a year ago with an attempt to determine what were the important local economic problems facing the nation, and it undertook a survey of local economic activities as found to exist among the thousands of local economic development groups operating in most communities (planning boards, redevelopment authorities, industrial development commissions, etc.) While this survey is not as yet complete, it became apparent at an early date in CED's appraisal of local economic problems that those problems which related to the urban-metropolitan areas were high on the priority list, and deserved early attention.

MOST URBAN CONCENTRATIONS were found to be facing the same general phenomenon: movement to the suburbs, shrinking tax bases, and physical decay in one form or another. The CED, at the same time, assembled an Advisory Board of experts in local economic matters, and this group confirmed the fact that some fundamental questions about cities required research and study. In addition to the basic question of the logical economic function of urban core areas, particularly in view of the combination of increased urbanization and decentralization which is taking place, other important questions are:

1. What present forces seem to be at work in most of the urban cores?
2. What kind of capital investment is required in order that the urban cores perform their more logical function?
3. How will these capital improvements be financed?
4. What kind of relationship is evolving with respect to the central city and its surrounding suburbs?
5. What are the long term implications of this relationship?
6. What logical series of steps is required on the part of communities in order to appraise the long term economic growth potential?

As a result of this initial inquiry, the CED has commissioned background research studies which are now in the process of preparation on the following subjects: "The Changing Economic Function of the Central City," "Some Implications of Metropolitan Growth for Government," and "Urban Renewal and the Urban Problem."

In view of the interest of architects in this problem, CED's "economic base" approach to the problem of urban centers should prove useful, for wide differences of opinion can be found in the profession regarding this urban problem. Some have been known to express the thought that even the small town is too large. Others are strongly convinced that new approaches must be made to our cities, and that we must develop a more sophisticated urban culture, with conscious efforts directed toward making our cities more attractive and functional. The problem of transportation, as an example, is one which is marked by disagreement on basic issues, and the dumping of traffic into city streets has caused never-ending debate among planners, highway engineers, and architects.

Urban renewal is another most important issue which, like transportation, offers many unresolved problems. Such fundamental questions as "How large is our total urban renewal need?" has prompted estimates which range as high as \$100 billion a year for ten years. As an example of change which has been taking place in our thinking about blight in our cities, the idea of urban renewal and redevelopment in 1940, when it was first discussed to any extent, prompted reactions from some that it was a scheme to bail out the landlords of slum property, and yet eighteen years later, the program is looked on as perhaps only in its infancy, and is perhaps the key to preserving the tremendous investment in our cities.

Still another issue involved in considerations about cities for which there is not as yet agreement is this large problem of metropolitan mechanisms to deal with metropolitan problems and provide better understanding as to the relationship between the communities within the same metropolitan economic framework. Whether the commuter is someone who cannot make a living in his own home town, or whether he is vital to the central city in which he works, continues as a lively issue for debate, and some architects who have concerned themselves with this problem have called for a new attitude about our cities to compensate for the suburbanization of American life which some have claimed has taken away decency at the center.

The fact that there are no clear-cut answers as yet to these problems has not in any way diluted CED's interest in pursuing these problems. As ex-

pressed by Jervis J. Babb, Chairman of the Area Development Committee and former Chairman of the Board of Lever Brothers Company, CED's approach is not at this time to provide answers so much as to raise questions and issues with which all of us must be concerned. Speaking of our present posture with respect to these problems, Mr. Babb recently stated, "Our position is an odd one—we are not yet completely dismayed by haphazard mushrooming development, or the choking of downtown traffic, or the abandonment of central city properties, and yet we do not like what we see. While we do not accept the view that our cities are lost, we do not wish to assert that all is well. What we may not have realized is that failure to solve some of these important local problems may, in fact, be placing a real limitation on our national economic future."

TO PUT THE PROBLEM of our cities in its proper perspective with relation to the economy as a whole, we are now an urbanized economy in which two-thirds of our people and 70% of our industrial production can be found in our urban-metropolitan areas. This urbanization has come upon us at a very rapid rate in terms of historical perspective, for although in 1850 only 15% of our population lived in our urban areas, by 1900, the percentage had increased to 40%, and by 1950, almost 65%. The population forecasters appear in general agreement that the population growth of the nation in the next fifteen years will be in the magnitude of approximately fifty million, and will occur almost entirely in our present urban-metropolitan concentrations. Part of our failure to date to deal successfully with our urban economic problems is that we know very little about them. The facts are inadequate; the statistics are relatively obscure; and as a school of

economics, urban economics has not become highly advanced. One of CED's objectives in its work in this area will be to assist in the development of a body of knowledge in order that the decisions which will have to be made will be based on more complete and better information than now can be found to exist.

Fundamental to CED's approach is the question of businessmen's responsibilities in connection with rebuilding our urban cores and the question of what kind of an economy we are shaping for ourselves, but what is happening within our cities is woven throughout CED's approach.

Since the present stage of the program is concerned with conducting background studies and methods of approach, CED would welcome the suggestions of AIA members, and it can be anticipated that CED will explore ways and means of doing so in a concrete fashion.

Trustees of CED working directly on these problems as members of the Area Development Committee are, in addition to Mr. Babb, W. Harold Brenton, President of Brenton Brothers, Inc.; Paul F. Clark, Chairman of the Board of John Hancock Mutual Life Insurance Company; Charles E. Daniel, Chairman of the Daniel Construction Company; Robert W. Dowling, President of the City Investing Company; Roy E. Larsen, President of Time, Incorporated; Ralph Lazarus, President of Federated Department Stores, Inc.; L. F. McCollum, President of Continental Oil Company; Stanley Marcus, President of Neiman-Marcus Company; L. B. Neumiller, Chairman of the Board of Caterpillar Tractor Co.; Beardsley Ruml; Ethan A. H. Shepley, Chancellor of Washington University; Charles P. Taft, Mayor of the City of Cincinnati; and James E. Webb, Chairman of the Board of Republic Supply Co.

A Welcome to *Horizon*

THE JOURNAL is pleased to recommend to its readers a new hard cover magazine, *Horizon*, the first issue of which appeared in September. This new magazine of the arts intends to "span the whole realm of mankind's creative talents, past and present." A vast undertaking, we admit, but one which we are certain that its publishers, The American Heritage Publishing Company, will undoubtedly handle with discernment and aplomb.

In the first issue is an intriguing article about

Edward D. Stone, FAIA, of special interest to architects, entitled "Not a Palace, But a Pill Factory." This article discusses Mr. Stone's pharmaceutical plant in Pasadena, California. A long, low structure set back among greenery and reflecting pools, the plant combines elements of contemporary style cantilevers, arabesque grills and a central Roman atrium. The article is illustrated with pictures of the factory as well as a number of other well-known Stone buildings.

through the MARTINI GLASS



DEAR BOSS, I want to tell you how I got to Iraq. What with my Beaux Arts training and the depression things were getting to a pretty pass since I didn't look good selling apples but one night I took a girl to a party and let her look goo-goo at a pale, tired archaeologist who had just returned from digging and had written a book and wanted an evening off. We got along handsomely and to the point that as we floated out the door I said to him, "Fred, if you ever go off on another one of those expeditions count me in."

About six months later he called me up and said that he was taking me at my word and that he had signed me on as an artist and to take along a pair of old pants, learn to play bridge and meet him in Beirut in September.

After we had been out there in the sheepherders village twelve miles from nothing but the British Club and the veiled beauties with nose rings and sheep dip hairdos, I got to pining for the good old days with Cret sneezing all over and telling me I did not know what I was doing. What I was pining for was Architecture, that's what I was trained for and here I was drawing pieced-together pots and full sizing spindle whorls and stamp seals. What I wanted was a nice little design problem and I really got it.

The rainy season came. One day Fred came to the drafting room which was a swaying mud floor over the guard room and said, with authority, "We need a two car garage. The damn dogs are chewing at the tires and the car won't start because it's wet and Bartow is too busy on the mound, so Al, you're an architect, you design it."

Well, there I was without "Ramsey and Sleeper," "Hool and Johnson," "Kidder, Nolan and Parker" or sixteen up-and-over door salesmen to help me figure loads, sizes, spans, seismic disturbance factors or even a Santa Fe Indian to tell me how thick a mud wall is required to hold a radio antenna. I was on my own and all my teachers were looking down at me and hoping.

I put aside my little collection of shards and borrowed the architect's T-square and a piece of paper and went and measured a car, multiplied by two and designed a beautiful free-standing two-car garage with a Parthenon pitch on the roof, carved beam ends where the rafters protruded and a beauti-

ful pair of swinging doors, with painted eyes to keep the evil spirits away from the University of Pennsylvania property.

All that took about twenty minutes with about five minutes getting Nedjma our laundry girl to pose her lovely kohl painted eyes so the Gods would know who to keep away from.

Finally Fred and the boys came back from the mound and at lunch we hung up the design so that everybody could give me criticism, change the curve of the volute or try a couple of more schemes. Finally Fred said it was all right and he would get Abdul Rahman the Sheik to come in for coffee and he would draw up a contract for building it.

I gave him the benefit of my experience and told him that we really should have a couple of AIA Forms of Agreement between contractor and owner and owner and architect and file a release of liens with the prothonotaries office in Baghdad and also make sure that we were covered by compensation insurance, fire, health and accident, and see that Abdul Rahman understood that all local, state, and national laws governing the rights and privileges of both contracting parties should be observed. We really should have the Beautifications Committee of the Iraq I.A. look at the scheme and maybe hire, Shlamoon, Shlamoon, Shlamoon, Shlamoon, Fethi, Basheer and Mizrahi, the Baghdad lawyers to look over the contracts.

Fred said that not only would he tell Abdul Rahman all that but also he would ask the Khai Maakam of Akbar, the Yezdi band and the Chief of Police of Mosul to come for the dedication ceremonies and bring along a harem of dancing girls to help us kill a sheep and swing a ball. In addition, said Fred, since I had designed it, henceforth I would have the title of "Muhandis" and would supervise the construction.

Abdul Rahman came for coffee in the afternoon and there we sat, Fred the Owner, me the architect,

and Abdul Rahman the Shiek of the Village and general contractor. On the table was my beautiful drawing. Abdul Rahman was an old Arab. He was through his eighth wife and was about to contract for number nine right after pay day. Nature, age, wine, women and song had worn him down. He could neither read nor write and even with his one eye he couldn't see the plans, besides he read from right to left and all of my notes were from left to right.

Fred explained the whole business to him in the local dialect of the Shiite Shebbeki and evidently it was all clear because Abdul Rahman nodded and drained his coffee and smoked a cigarette and his good eye lighted up as if he was looking at a twelve-year-old expensive bride, which he could now easily swing from the profits.

The Shiek looked at me and said a lot of things, the only word of which I understood was the word "Muhandis" which means engineer. Then Fred said that if I would walk off the rough approximate sizes in the field across the mud street, the village would take care of the rest. If I had a few spare minutes from my regular work in the drafting room I could walk around the corner and inspect, but otherwise to relax and let it come to me and maybe I could learn a couple of things about building which would come in handy if I married a village girl and hung up my shingle or maybe a sheepskin. The details would have to be worked out and Abdul Rahman would be back for another conference.

In about a week the final details were set. The women of the village would make the bricks and the Shiek's son-in-law from Rowanduz knew a man who would cut some trees in Persia and bring them down by camel train in a couple of months and by that time the snow would be gone and the walls up. They weren't big enough for the roof rafters but they could rope them together. Near Kirkuk there were some old planks from packing crates and they could be used for the doors, if we could get an ironmonger in Mosul to beat out a couple of sets of hinges. There was still time to use some of the threshing-floor chaff for binder and if they could get started the rains would keep the streets muddied. Fred and the Shiek shook hands and agreed that if it was all right he would be paid when the work was finished and stipulated the amount.

The next morning construction started, at least the manufacture of the bricks. All the camels, sheep, donkeys, dogs, turkeys, chickens, ducks and geese were herded up to the pool at the head of the village where they drank and generally loaded up and then they were driven down the main street urinating and generally misbehaving, all according to order.

Meanwhile the main muddy street had been generously carpeted with all the loose grain, chaff, wheat, leaves, flora and grasses torn from the surrounding hillocks. The animals marched down the street, urinating and messing up the place as ordered and then were driven up to this soggy mess, the women and children of the village dove into the mud and made mud bricks about a foot by eighteen inches and six inches thick and spread them over the surrounding area to dry in a lucky day of hot sun. In the afternoon we all had fly-bite fever and by the next morning the garage was half built. By evening the three walls were up and stood looking lovely, mud brick plastered with nice mud and the Shiek was in to get the pay for his girls and his ten percent for supervision and ten percent for being clerk of the works, foreman, master brick manufacturer, plasterer and representative of the Iraq Federation of Labor.

In the cold of a snowy, winter's morning a couple of months later we were awakened to the sweet sound of camels bells and looked out the window to see our roof rafters arrive from Persia. Great trunks of twelve foot trees about four inches in diameter and still wearing their winter bark. The girls came out and carried them on their backs to the site and a couple shinnied up the wall and pulled them up into place. They pushed one trunk up vertically and with a notched branch end pushed the rafters into place and roped shorter lengths and made a roof tree out of a couple of big ones.

After a good breakfast we inspected the completed ribbing and found it good and then the whole process of making bricks started again and by the next day the girls had laid bags across the rafters and mud bricked the roof in place and were treading it solid. We parked the cars in the garage that night and waited for spring when word came that the packing crates in Kirkuk were finally opened and we would have our door material in a few days. About a week before we left the planks arrived and finally the ironmonger in Mosul came out with a couple of sets of wrought iron hinges and a bolt. As we packed on the last day to leave and put the cars up on jacks I finally got Nedjma to pose again as we painted on the seeing-eyes to keep the evil spirits away, Abdul Rahman put this thumb print on a paper for me, which I had written in Kufic as a release of liens. We mounted the station wagon and headed westward into the dying sunset, America, home and the practice of architecture with yet another building added to my portfolio of completed work to show to future clients.

August Bendure



Photo by Aloysius Schuszler, AIA

The Disappearance of PENNSYLVANIA STATION

LEWIS MUMFORD

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FOR PERHAPS TWO YEARS, I have watched, with silent misgiving, the reorganization of the interior of Pennsylvania Station. As the extent of the demolition grew, my bewilderment grew with it. I could hardly believe that any rational purpose could justify the devastation that was being worked, and as the bottoms of the row of great stone columns that run from north to south across the station were chipped away and covered with a light-hued plastic, my bewilderment became incredulity. So I waited, hoping that some brilliant stroke of planning, beyond any notions I could form from the unfinished work, would turn the phantasmagoria my eyes beheld into a benign dream. But now that the scheme has taken shape, it is plain that I waited in vain. As things are going, I fully expect that Jules Guerin's begrimed mural maps, which adorn the walls above the concourse and which were once, not unjustly, described as one of the few examples of successful mural art in the country, will give way to colossal color transparencies or winking whiskey ads. The only consolation is that nothing more that can be done to the station will do any further harm to it. As in nuclear war, after complete destruction has been achieved, one cannot increase the damage by doubling the destructive forces.

THE Pennsylvania Station, now half a century old, was the collaborative product of Alexander Johnston Cassatt, the Pennsylvania Railroad's president, and Charles Follen McKim, of McKim, Mead & White, who got the commission in 1902 and finished the job in 1910, after four years of building. The purpose of Mr. Cassatt had in mind was to provide a magnificent, monumental structure that would serve the railroad well and embellish the city. "Certain preliminary matters had to be settled with President Cassatt before McKim could begin to think of the design," Charles Moore, McKim's biographer, notes. "The company had a notion of utilizing the very valuable air space above the station by building a hotel. Mr. McKim argued that the great Pennsylvania Railroad owed the metropolis a thoroughly and distinctly monumental gateway." And professional and civic pride won out over cupidity. But, unfortunately, the spirit of adventure had gone out of American architecture. Except for Louis Sullivan, Frank Lloyd Wright, and a handful of their followers, no one any longer had the courage or the imagination to create new forms native to our own culture and the century. So the station was cast in the classic form of the Roman baths of Caracalla; indeed, McKim had intuitively prepared himself for

this commission, in 1901, by assembling a gang of workmen in those very baths, so that he could study the esthetic effect of the huge scale of the structure on the crowds passing under its arches. The punctuating beat of the rows of vast classic columns, without and within, of Pennsylvania Station turned out to be the dying note of the classic revival that had begun in 1893 with the Chicago World's Fair. But though the classic forms were symbolically dead and functionally meretricious, McKim's handling of the main elements of the design for the station was superb. The basic practical problem, created by the fact that the railway tracks, in order to pass under the East and Hudson Rivers on their way out of town, were far below ground, has, it is true, never been properly solved. Above the track level is a second level, along which one makes one's way from the trains to the subway lines on Seventh and Eighth Avenues; above this is a third level, containing the concourse and the ticket offices, and flanked by the taxicab ramps. Even this level is well below ground, and it is reached from east, west, north, and south by broad stairways from the streets surrounding the station. The ambiguity of the many exits from the trains, some leading to the second level and some to the third, is baffling to anyone at-

tempting to meet a person arriving on a train, and creates a certain degree of confusion for the traveller seeking a taxi or a subway. Even worse, the inadequacy of the escalator system handicaps the passenger with heavy baggage much more today than it did in those fabled days when porters were numerous and did not become invisible when a train arrived. In these respects, the Thirtieth Street Station in Philadelphia and the Union Station in Washington, even with their two levels of railway tracks, are more satisfactory, despite the fact that the system of widely spaced double exits in the Philadelphia station makes meeting an incoming passenger difficult without prearrangement.

But, apart from these vexatious lapses, the general plan of Pennsylvania Station had a noble simplicity that helped it to work well. A broad, unobstructed corridor, running from east to west, was the visible expression of the station's axis, from Seventh Avenue clear through to Eighth Avenue. McKim made good use of his eight-acre site, which covered two entire blocks, by providing a sunken entrance, at the concourse level, for vehicles on both the north and the south sides of the station—far more adequate than the accommodations at Grand Central. If one approached the station by car, one had to walk but a short distance to the ticket windows and the trains. The ticket offices, the big waiting rooms, and the ample concourse, capable of embracing the largest holiday crowds, were at right angles to the axis and flanked the broad corridor. McKim, wishing to keep the axis and corridor clear, even placed the information booth in a northern corner, in a niche formed by the men's waiting room and some of the ticket booths, but wiser heads soon moved this important facility to the center of the ticket hall, so that passengers could approach it from the four points of the compass. McKim's plan had a crystal clarity that gave the circulation the effortless inevitability of a gravity-flow system, with pools of open space to slow down or rest in when one left the main currents. Movement is

the essence of transportation, and movement is what McKim's plan magnificently provided for. Amplifying this spaciousness were the great columns and the high ceilings of both the main entrance corridor (leading west from Seventh Avenue and lined with shops and restaurants) and the ticket hall, waiting rooms, and concourse—the scale gigantic, the effect not only imposing but soothing and reassuring, as if a load were taken off one's chest. In this terminal, meant to encompass crowds, there was no sense of crowding; the ticket hall was as long as the nave of St. Peter's. The shopworn tags of McKim's classic decoration receded from consciousness, and what remained was a beautiful ordering of space, whose proportions veiled the inappropriate decorative pomp and nullified the occasional irritations of the ascent from or descent to the trains. Even the fifty-year accumulation of grime on the travertine walls of the interior has not robbed this building of its essential grandeur, which now suggests what one is aware of in the musty subterranean passages of a Roman bath. There is never too much of that quality in a city. It comes from a princely sense of magnificence, a willingness to spend munificently on a purely aesthetic pleasure, instead of squeezing out the last penny of dividends. American railroad stations as late as twenty-five years ago compared favorably with those of England and the Continent, because of their interior serenity and dignity as well as the fact that they were then altogether free of advertisements—a point the European traveller often remarked on, with pleased surprise, as a contradiction in the land of the almighty dollar.

NO ONE now entering Pennsylvania Station for the first time could, without clairvoyance, imagine how good it used to be, in comparison to the almost indescribable botch that has been made of it. To take the most favorable view of the new era, let us enter the main approach, from Seventh Avenue—the only element left that faintly resembles the original design. But the spaciousness of the

corridor, with its long view, has been diminished by a series of centrally placed advertisements—a large aluminum-framed glass box for posters; then that standard fixture of today's railroad station, a rubber-tired confection from Detroit suggesting to the guileless traveller the superior claims of private motor transportation; then another poster box, holding an illuminated color photograph of a steak dinner. These nagging intrusions are only a modest beginning; in time, the top of this great, barrel-vaulted corridor will probably, like the concourse, be punctuated with transparencies and flying signs. Happily, these obstacles serve an esthetic function; they soften the shock that one encounters at the head of the stairs to the main floor. There one discovers that almost the whole interior arrangement has been swept away. The broad east-west corridor has vanished, and in its place a huge plastic crescent canopy, brittle, fragile, and luminous, opens out, fanlike, across one's view—a canopy slanting upward at an awkward angle and suspended in midair by wires from the sturdy-looking stone columns of the original design; i.e., a masterpiece of architectural and visual incongruity. This vast arched canopy drenches the space below it with diffused fluorescent light, illuminating a semicircle of ticket counters and, behind them, clerks at ranks of desks. The semicircle completely blocks the main channel of circulation to the concourse; moreover, it conceals the bottom half of the great window that once marked the western end of the station's axis. The counters of the ticket office are laid out in sawtooth indentations—open and without grillwork, like the ones in the newer banks—and a closed-circuit television set beside each counter presents the intending traveller with a visual summary of the accommodations available for the next week or so on whatever train he has in mind. This saw-toothed arrangement and the abandonment of the framed booth are the only elements in the design for which the most charitable observer can say a good word; let the reader linger over this

moment of praise. The rest of this new office is a symposium of errors. To provide enough space in the rear for the booking clerks, once housed in the innards of the station, the designer wiped out both waiting rooms, for which a wholly inadequate substitute has been provided by a few benches on the concourse. To reach these, and the trains, one must walk all the way around the ticket counters. And the large central information booth has disappeared, to be replaced by a tiny counter tucked away north of the stairs from the Seventh Avenue entrance in such a fashion that people making inquiry at it obstruct one exit to the subways. "Meet me at the information booth" is now, at any busy hour, a useless suggestion. "Meet me at Travelers Aid" would be more to the point. To conceal the information booth so neatly and to block so effectively an exit is a feat that only emphasizes the quality of this renovation—its exquisite precision in matching bad esthetics to a bad plan.

AND there are other places in Pennsylvania Station where this carefree treatment has been equally successful. There are separate counters for buyers of coach, parlor-car, and sleeping-car tickets, but since the counters are identified only by numbered orange, green, blue, or red signboards, one must consult an index board beforehand. The use of colors is an excellent means of identification for all but the color-blind. Unfortunately, though, the numerals, which are white, do not show up clearly against the light green, and they virtually dissolve into the dull orange; only the red and blue backgrounds have a decent visibility. (Bold numerals, like the ones used in the central Rome railroad station, would remove the need for color identification.) No one can claim that this feeble, reticent color scheme represents an unwillingness to introduce a strong discordant note, for of such notes there is a jarring plenitude—the greenery-gallery walls next to the train hall, the stark white and black of the telephone booths, the effulgent stainless steel of the new

shops and booths that have been erected on the main floor; in short, a West Forty-second Street garishness and tawdriness characterize the whole reconstruction. With this overall design to establish the level of taste, the fevered illuminations of the soft-drink machines are fitting embellishments of the general chaos.

But these are minor matters; the great treason to McKim's original design, and the overpowering blunder, is the conception of these misplaced ticket counters, with their background of ticket clerks busily acting their parts under television's myriad eyes. If treated rationally and straightforwardly, the change-over to open counters with television equipment and doubled space for ticket selling could have been accomplished without destroying a single important feature of the whole station. But rational considerations of fitness, function, and form, with a view to the ultimate human decencies, seem as unimportant in the reconstruction of Pennsylvania Station as they do to some of our designers of motorcars. One suspects that the subversion of McKim's masterly plan was due simply to the desire to make the whole design an immense advertising display, and, in fact, this design now centers on the suspended canopy, which not merely provides a ceiling of light for the office space below but juts out many feet beyond the counters, as if it had the function it might serve in the open air—of offering shelter against rain. The purpose of such a design, psychologically speaking, is possibly to convince the railroad user either that the Pennsylvania Railroad has gone modern and that the old station can be as pinched for space, as generally commonplace, as a bus terminal, or else that it can be as aerodynamic in form as an airport terminal. The effort to shorten the time needed to make reservations is a laudable one, though it may be doubted whether electronic feathers will do much to improve a system whose worst bottleneck is not communications but wholesale advance bookings by business corporations (often far in excess of their needs), which create the difficulty of allot-

ting too little space to too many. But let us nevertheless assume that the new installation provides handsome gains in efficiency. These gains must be weighed against serious losses of efficiency at other points. There is no reason, for instance, that the booking clerks should occupy the space once given over to waiting rooms. As a result of this pointless dramatization of the process of ticket selling, the waiting passengers are now squeezed onto a few benches, many of them a constant obstacle to passenger circulation.

WHAT on earth were the railroad men in charge really attempting to achieve? And why is the result such a disaster? Did the people who once announced that they were planning to convert the station property into a great skyscraper market and Fun Fair decide, finding themselves thwarted in that scheme, to turn their energies to destroying the station from the inside, in order to provide a better justification for their plans? Or did the management see pictures of the new Rome station and decide that it would be nice to have a station equally up-to-date, and even more flashily so? But they forgot that though the Rome booking hall is in effect a canopy, it is a free-standing structure poised dynamically on its own base, serving not as a piece of phony stage decoration but as a shelter for its activities. To transport the idea of a canopy into Pennsylvania Station, whose overwhelming quality, aesthetically, depends upon its free command of space, was to nullify not merely its rational plan but its height, its dignity, and its tranquil beauty. If the planners had cut the height of the main level in two by inserting another floor above it, they could not have debased the original design more effectively than they have by introducing that mask of light, suspended by wires. This glaring device was not necessitated by the television system of communication. The special merit of such a system is that the headquarters of the operation can be miles away from the place where the information registers. To disrupt the whole flow of

traffic through the station so as to put the system on display is a mis-carriage of the display motive.

Behind this design, one must assume, was the nation that has made automobile manufacturers add airplane fins to their earth-bound products. This shows a loss of faith in their trade, on the part of railroad men, that may hasten the demise of the railways. If they had sufficient pride in their own method of transportation, they would emphasize the things that make it different from air or motor transportation—its freedom from tension and danger, the fact that planes stack up interminably over airports in poor weather, the fact that a motor expressway, according to surveys, can handle only four thousand people an hour, while a railroad line can handle forty thousand people an hour. This capacity for coping quickly with crowds that would clog the best highway facilities for hours is the special achievement of the railroad. What the railroad does superbly the motor expressway does badly, and planes, even though they travel at supersonic speed, cannot do at all. This was boldly dramatized by McKim in the great vomitoria he designed to handle the crowds in Pennsylvania Station. Everything that clutters up a railroad terminal either physically or visually must accordingly be rated as bad design, and, ultimately, because of its retarding effect on convenience and comfort,

as bad publicity, too.

Some of the engineering ingenuity that was spent in devising the vast electronic jukebox of Pennsylvania Station might well have gone into repairing the crucial error in McKim's design—the failure to carry the system of circulation into its final stage; that is, an adequate method of passing immediately to and from the trains. As it is, a beautiful trip out of town can be soured in a few minutes by the poverty of mechanical means for changing levels and for transporting hand baggage. Moving platforms, escalators, lightweight two-wheeled luggage trucks, like the carts at a supermarket; identification signs for baggage lockers, so that one might recognize at a distance where one left one's bags, just by looking at the color of one's key; a well-identified enclosure for meeting—such highly desirable improvements as these are untouched by the present innovations. The lack of improvements in these essential matters is a symptom of the bureaucratic fossilization in railroading, and that backwardness cannot be overcome by jazzing up the ticket service. If the Pennsylvania Railroad had given thought to these inefficiencies and discomforts and inconveniences, it would have treated the improvement of the ticket services with the same sharp eye on the business of railroading, and with the same readiness to keep the original design quietly up-to-date, without sacrificing the qual-

ities in it that are timeless. Such a thorough renovation might be even more expensive than the present disarrangement, but it would pay off by improving every aspect of the service, instead of simply faking a loudly "modern" setting in the hope that the passenger will forget the many ancient coaches and Pullman cars, with their shabby upholstery, that are still in service.

But no sort of renovation of Pennsylvania Station makes sense until the railroad is ready to commission the one operation that would really cause it to look fresh and bright without benefit of fluorescent lighting—a complete cleansing of its soiled interior. The plaster has begun to crack and peel in the Seventh Avenue corridor; the mural maps are almost invisible; and, as if to accentuate the dirt, the thrifty management has merely scoured the columns and walls to a height of ten feet, making the worst of a bad job. As for the vast blaze of light from the low ceiling in the renovated portions, its chief effect at night is to make the train hall look as though it were under an air-raid blackout. If it was sad that Alexander Cassatt should have died in 1906, without seeing his great station erected, it was a mercy that he did not live until 1958, to witness its bungling destruction. It would take even mightier powers than these old railroad titans wielded to undo this damage.

Relativity

Einstein claimed the universe
Was relative through infinity
May I suggest to be perverse
Integrity and virginity.

—HUBERTUS JUNIUS



1

Fifth Annual *Potomac Valley Competition:*

JURY:



Left to right: Hugh A. Stubbins, Thomas K. Fitzpatrick, and George Matsumoto judging designs for the Potomac Valley Competition.

The Potomac Valley Chapter has recently held its fifth annual competition for awards in architecture. There were more than 100 entries from the 35 firms registered in Maryland. The awards were of two types, the Award of Merit and the Honorable Mention in various classifications. The jury for the competition included Dean Thomas K. Fitzpatrick, Hugh A. Stubbins, and George Matsumoto. 1. Award for Merit to Keyes, Lethbridge and Condon for the residence of Michael Straight in Alexandria, Va. 2. Honorable Mention to Keyes, Lethbridge and Condon for the Potomac Overlook Development in Bethesda, Md. 3. Award of Merit to Ronald S. Senseman for the Stow-away Motel in Ocean City, Md. 4. Honorable Mention to Keyes, Lethbridge and Condon for St. Patrick's Episcopal Church in Falls Church, Va. 5. Honorable Mention to Joseph Miller for the Agudas Achim Congregation's Synagogue in Alexandria, Va.

The *Journal* regrets that it could not publish all of the winners. We have selected a representative group of buildings from the various classifications to point up the variation in design which made the final decisions of the judges very difficult ones to make.



2 3



4

5



Architectural Research:

RESEARCH IMPLIES SEARCH for the undiscovered or unrelated, whose past occurrence, once known and plotted, can shape principles by which we predict future happenings. What then shall we say about research in architecture? Building may be described as the process by which man changes his fixed physical environment. Those characteristics of building which affect him as a human being, constitute architecture. While building may be defined as the process of changing environment, architecture may be defined as those qualities of building that impinge themselves on the consciousness of man. Stated another way, architecture is how building seems to people.

Research in Architecture

HAVING MADE these assumptions regarding the nature of research and of architecture, we can attempt a statement about the nature of architectural research. Since research in architecture is bound to lead us into the presently unknown, we will do well to seek a broad definition that will indicate direction rather than restrictive boundaries.

Change in the Causes of Architecture

ARCHITECTURE has to change because the forces that create it are changing. Our ways of life are changing, especially in areas such as transportation, communication and manufacturing. Populations are shifting and growing rapidly. That our techniques for building are changing radically is indicated by the synthesizing of materials, the development of new engineering methods, and the industrialization of the building process. These developments are seldom the doing of architects, but architects have to express and relate them to human needs. We cannot express them in architecture without understanding them, and we cannot understand them without experimenting with them.

Since they are happening at too great a rate of change for proper experimentation in the normal practice of architecture, we have to isolate the experiments and seek to establish principles that are generally applicable to the individual project.

Architectural Research Defined

ARCHITECTURAL RESEARCH is simply the process of seeking principles of architecture through the methods of research. Our definition of architectural research follows naturally from having defined research and architecture.

The Tempo of Change

ARCHITECTURE got along very nicely in past centuries without formalized research. Principles grew out of the slow, orderly development of buildings, with experimentation generally limited to minor deviations from a traditional norm. The cultural values which architecture expressed and served changed at a comparatively slow pace, and technical method was relatively static. What experimentation there was could happen as buildings were built; an unsuccessful experiment was simply not repeated, and since it represented a minor deviation from tradition, it was not a catastrophe. Principles of architecture were developed and established so slowly as to be assumed as traditions. The evolution of the Greek temple, the Maya ceremonial center, the Japanese house, was in each case slow and thorough. Identical, natural materials were used for centuries. Geographical areas of influence were limited. In sharp contrast, our century has witnessed violent explosions of change in the forces that create architecture, and the problems that have arisen are too great to be solved within the design process of individual buildings. This change of tempo can be illustrated with simple examples. The process of alloying bronze from copper and tin was discovered and developed

Its Nature and Practice

ROBERT W. McLAUGHLIN, FAIA

Director, School of Architecture, Princeton University

during an early period in man's urban life, and through thousands of years was simply used in building elements such as stone ties or temple doors. In striking contrast of time period, non-ferrous alloys of aluminum or chrome-nickel steel were discovered and intensively developed in research laboratories during a decade or two of this century. They immediately presented opportunities and problems beyond the possibility of solution by individual architects in the design of individual buildings. The incorporation of these alloys in areas of architecture such as curtain walls has already of necessity and with profit been a subject of architectural research. Similar contrasts can be found in the rate of development of transportation as indicated by the problems in architecture and planning due to the automobile and airplane. These problems have proven to be beyond solution on an individual project basis, but require collaborative research that will be available generally.

Research a Necessary Result of Accelerated Change

TODAY OUR CULTURAL NEEDS are shifting, changing and expanding at an ever faster and accelerating rate. Materials and techniques are many, varied and complicated, and are becoming more so. Communication, notably by photograph, makes a building method or design evolved in one area immediately available over the rest of the world whether suitable for the area or not. Little Lever Houses irrationally spring up in unsuitable climates. The architect in his practice cannot afford to explore deeply enough the unknown areas where the search for desperately needed principle would lead him, and the individual project can seldom stand the degree of experimentation that is desirable. The choice then lies between timidity in practice or chaos in building. Since the forces that produce architecture

are changing, the resultant architecture must change. The purpose of research in architecture is to analyze these forces and establish principles which relate the forces to the needs of man. Architecture is qualitative and man has learned that he can predetermine those qualities through the design process. Through architectural research he seeks principles which, once discovered and established as valid, can be applied to the individual project with known conclusion.

The Development of a Program

HOW SHALL we go about our search for principles in architecture? In other words, how shall we go about architectural research? One way is to explore at random any area where problems are obviously troublesome. This has been our method in the past and a fair amount of valuable research has resulted. This is the method of the individual who simply sees a problem and attacks it. At the other extreme would be a carefully formulated program which would attempt to divide architecture into a series of segments. I do not believe that this is possible. Architecture is too all inclusive. It cannot be represented as a round pie to be neatly sliced into pieces of a research program. The very fact that we propose research, of itself tells us that we do not know all about the subject. The basis for a program lies somewhere between the random stabs of the curious individual and an all inclusive diagram. We have advanced far enough in our questioning to be aware of definite areas of study within the vast subject of architecture. Here are some of the areas that are apparent.

1. *Analysis of the process of development of architecture.* How and why does architecture assume particular forms and characteristics in particular areas and times? Answers lie in the study

of earlier cultures. Not only is there value in the analysis of the background of our own Western civilization, but it is also well to study cultures removed from the Judeo-Christian-European tradition, where we can be more objective in our analysis. The findings of archaeology and anthropology are our instruments. When we learn how earlier architecture came about, we are in a better position to condition our own. Research in architecture, from this aspect, consists of searching for the factors that have determined the nature of architecture in the past. We are seeking a philosophy of the history of architecture on an objective rather than an emotional or traditional foundation. The strata of the archaeologist and the anthropologist hold many answers about architecture.

2. *A study of the relation of architecture to the forces of nature.* Man seeks an optimum physical environment, and consequently designs his buildings so as to protect himself from extremes of heat and cold, of sound, of sun and wind, and of light and darkness. These natural forces are measurable and their impact on man is also largely measurable, as is man's best relationship to them. This area is sometimes referred to as research in environmental design, and includes the study of the relationship between architecture and climate. It envisions a well designed building as an ideal filter between man and nature, keeping out an undesirable element such as extreme heat in summer or cold in winter, and filtering in enough of the elements to create a stable and pleasing condition. The findings of physics are used in measuring the natural forces with the methods of biology and psychology available for measuring their effect on man. Through one type of architectural research we resolve these findings into principles on which the architect can design the buildings that stand between man and nature.

3. *Architecture as the expression of social forces and as environment for society.* Man's decision to live in groups in stable locations led to the building of towns and cities. The ways in which men organize society determine the nature of our cities, and in turn the nature of our cities has a profound effect on the nature of society. An extreme example of this is the slum. Architecture unrelated to the interests of society produces a slum as soon as it is built. The study of human ecology, which is concerned with the relation of society to physical environ-

ment, and vice versa, holds keys to the understanding of the nature of our cities which can lead to wise planning. The methods and findings of the social scientists are applicable in this area. Urban research, which is architectural research in its widest aspects, leads to principles badly needed for understanding and conditioning the growth and deterioration of cities. Necessary here are the findings and collaboration of sociologists, economists and political scientists, to mention several of the related disciplines. The growing demands for educational facilities, produced by population growth and higher standards, call for the development of school buildings quite different from those existent, and research is being done by foundations and universities to find ways to meet this need. A similar statement can be made about hospitals. There is much still to be done in such fields.

We have come to realize that the areas to the east of Park Avenue in New York and behind the mining camp front of Michigan Avenue in Chicago are also architecture—bad architecture. Research both in the methods of urban renewal and in the design and financing of housing have received considerable support from government, although we are still going largely by a trial and error method. A great problem here is to find ways to relate the mass of reports to what is actually happening.

4. *The study of the organization and functioning of the building industry.* The building industry in the United States is the means by which man's environment is being changed at a rate never before equalled. We are in the biggest building boom in history. Quantitatively, it accounted for about sixty billion dollars in 1957, a seventh of our gross national product. The building industry is unlike any other industry. It is loosely integrated when integrated at all. It operates under a financial structure which plays a large part in determining what is built and where. It needs to be understood as the agency by which whatever is built is built. Its financial structure, largely consisting of the mortgage system, generally determines what can be built. Economic studies are revealing and constructive. The methods of the building industry have undergone a shift from handicraft to industrialization; understanding and channeling of this process toward the common welfare requires, and is a fruitful subject of, research.

5. *Technique.* Technique, or decision as to material and method in building, is bound to affect results in architecture, though it is hardly an end in itself. The materials that go into a building are the solid stuff with which we create the intangibles of architecture. Today they are numerous beyond count. They are offered and in use before we have had an opportunity to analyze their qualities. No single architect can be aware of all of them, and our piecemeal method of building is giving way to large assemblages of structural and finished units. Architectural research is quite beyond and different from product development, but the moment two new products are brought together in a building, a problem in architectural design and detailing arises. It is foolhardy to expect the best method for their combination to be worked out independently by each architect on each job, and so there is a need for research in methods of combining materials. An example of this occurs in practically any wall, with outside surface, structure, inside surface, insulation, openings and means of attachment, often each of different materials. Composing these elements into a satisfactory whole is a study of importance. It took our founding and settling fathers two hundred years to develop the balloon frame from the timber resources of this country, and yet we are expected to incorporate a multitude of new materials almost instantly in new buildings. Obviously there has to be centralized, intensive research into these problems with resultant principles of use. Fabrication and assemblage of materials has rapidly moved from handicraft operations in the field to mechanized processing in the factory. Control of the building operation has largely passed from individual skill to centralized management. Research has to stand behind the technical decisions of management. To a great extent this cannot be the responsibility of any single manufacturing company, since a number of materials are usually involved. The method used in the problem of architectural research.
6. *The impact of architecture on the consciousness of man.* Architecture, when logically executed, is an expression of man's needs and aspirations. Once executed it affects man. This has never been better said than in Churchill's often quoted statement that we shape our buildings and then they shape us. The impact of architecture reaches the individual through his senses,

largely but not exclusively through the eye. Architecture is not solely a visual art. The life of the blind is conditioned by the architecture within which he moves. A good sleep can be affected by architectural design as sound, light, and heat are controlled. But essentially in this area we tend to deal with man's enjoyment of architecture; call it esthetics if you will. We badly need principles here. The method of the academy or atelier, with knowledge passed on through the individual master, has proved inadequate. But we are still affected too much by the emotional influence of the highly convinced and persuasive individual. Not one but many individuals would lead us in many directions at once. The stimulations of Wright, Mies and Le Corbusier, to mention three from three countries, cannot all be accepted as doctrine, nor is one enough.

We need research into the visual impact of space, the analysis of scale, the effect of color. The methods and findings of the natural sciences are available. Physics can certainly measure light, and psychology can tell us much about its effect on the eye and brain. It remains for the architect to relate them through design.

How and Where Shall Architectural Research Be Done

A GOOD DEAL of architectural research has been done, more than may have appeared through limited means of communication, and in addition a tremendous volume of related research lies behind the area of architecture, conducted usually without thought of architecture.

As an example, we can illustrate the involved relationship between architectural and non-architectural research, with a development such as that of thin shell concrete shapes. An inches-thick dome of reinforced concrete, spanning a hundred or more feet, and integrated as the roof of a building, becomes finally a product of architectural research. The inception of the process that made it possible, however, lies in the area of pure mathematics, applied to formulae which could then be used in engineering calculations, on the basis of which the dome could be structurally designed.

Research work in geology, physics and chemistry lies behind every bag of Portland cement that goes into the dome. A truckload of high tensile reinforcing rods, casually dumped at the site, is made possible by studies in metallurgy with all the ramifications of that discipline in the physical sciences. So much for technique.

The question then arises as to the requirements

of the particular use involved. Thin concrete shells have been used for the hulls of ships, sections of aqueducts, and for bridges and swimming pools. When the shell is considered as a method for covering a building, a whole new set of human needs arises, since the reason for building this dome lies in the people who will be living under and around it. Its use is now solidly in the realm of architecture and the principles for determining its use are the responsibility of research in architecture. The weather will have to be dealt with on its upper surface and problems of condensation on its inner surface if it is exposed to heated air. Means of acoustical correction will have to be considered, and natural and artificial lighting incorporated. The size and shape of the shell will be studied from the point of view of the use of the building and its relation to other buildings. It will be supported by wall or column elements whose design will be affected by technical factors such as concentration of stresses in the shell, the creep of the dome after pouring, and soil bearing capacity. In addition there are human factors such as how people are going to get in and out of the building, and how the shell will appear to people. This last factor of appearance is more than skin deep, because people's concept of a dome has been conditioned by the stone work of St. Peter's, which is not only of solid thickness but is visually buttressed with familiar architectural vocabulary borrowed from Rome. The viewing of the exposed edge or section of a dome only a few inches thick which spans an area equal to the crossing of St. Peter's may involve problems of security and adjustment for the man under or near the dome before he can indulge in what is known as architectural delight. (Perhaps this visual experience will produce a psychosis of insecurity which becomes the problem of another profession.) At any rate, esthetics are certainly involved.

Lurking behind all this design process will be economic studies, relating technical method and human needs to cost factors, weighing relative values of material, labor, time and engineering, and rates of depreciation and obsolescence. There will be a constant questioning as to the "rightness" of using a thin shell concrete dome instead of an alternative method, and in many instances the economic findings will be negative. So perhaps principles developed through research in the area of building economics will mean that the particular shell we have discussed as an example will never be built after all, unless principles are overridden by a controlling desire for architectural exhibitionism. (In that case we shall have to go to the psychologist for our answer.)

This example indicates the range of research

which is relevant to architecture. We cannot imply any orderly process upwards from basic science, through degrees of applications leading inevitably to conclusions in architecture. It may be that the designer contemplated the shell of his breakfast egg and then and there wanted to do a thin shell concrete dome. If so, he still had to find the necessary principles of mathematics, engineering, technique, economics and esthetics. But it is clear that however the design process may work, whether inductively or deductively, many disciplines contribute to architecture, and their findings to architectural research.

For this reason the University appears to be a most suitable place for research in architecture. Nowhere else can the findings of related areas of knowledge be so readily brought together. And the professional Schools of Architecture are already there. The search for knowledge is fundamental to good teaching. Incidentally, to return to defining the area of architectural research, we can do worse than to say that whatever we teach to future architects is a proper subject for architectural research. We might also include what we would like to teach.

Architecture, Research and Principles

HISTORY RECORDS man's constant effort to change and improve his environment. He has changed it through building, and improved it through architecture. He has also damaged his environment through architecture—bad architecture.

Building executed without regard for its impact on man, that is, building done without regard for its quality as architecture, is not just amoral, but immoral. Building is bound to condition human life as soon as man is affected by it, whether consciously or not. It never can avoid its responsibility to be architecture, and whoever decides what, where and how to build immediately assumes the functions of an architect. A responsibility of our profession is to try to see that building becomes good architecture: it cannot escape being architecture, whether good, bad or indifferent, as soon as man is aware of it. The determination of what is good and what is bad is a matter of principle, and the purpose of research in architecture is to discover and establish principles, principles that are scientifically demonstrable and universally applicable; and which when practiced will shape the gigantic and apparently chaotic forces of our time into a reasonable and orderly process of creating man's physical environment. Our purpose and hope is that this environment may be good. If we seek through research, and then apply through practice, principles that are demonstrably true, we shall be well on toward this goal.

CITY AND CITIZEN

BY ARTHUR C. HOLDEN, FAIA

I

How many generous citizens may feel,
In work that feeds, a rank hypocrisy?
Men hold ideals and yet they seem to steal
A wherewithall, that saps vitality.

If social conscience serve as human guide,
How desperate must the urgent belly be,
To disregard the mind's capacity,
And bury judgment under hunger's tide?

A million routines with a bitter taste,
And struggling millions, bound by tasks they hate,
And Beauty lost in unconsidered waste;
A warning, not the final call of Fate.

Courage, and to our brothers' heartbeats hark,
One spark within the soul can light the dark.

II

When man controls real property to flout
Advantages, through envious scarcity,
Man stands alone, like single note without
The blending that produces harmony.

Why can't men act together, when they see
Status flout need? Do minds lack acumen
To organize so services might be
More satisfying, making happier men?

How then proceed to shape environment?
Must state assume the role of tyranny
And bind men through control of property?
Or can groups act with concert of intent?

World of exchange—Is there no way to give
Check to the selfish yet let generous live?

III

Who works with joy more real than architect's?
His art shapes growth, proportions ordered space
And builds so man's environment reflects
Life, habits, character, and spirit's grace.

Has workmanship the power to liberate
Through understanding which true service brings?
Has happiness that comes, when men create,
Fed hungry mouths and bought essential things?

The power to serve awaits consumers' call;
Men yearn and need yet live in ways outworn;
Contracts and rules bar changes physical
And tawdry city life must still be borne,

Till men demand new beauty and new forms
Rising above doubts, fears, and wastes and
storms.

IV

Yet how apply best effort where need calls?
In the ideal, exchange may bring reward;
But shrewd contrivers find that favor falls
Through use of counters, filched by craft or sword.

Must man, unknowing art, just dumbly wait,
Till social usage can devise new tools?
Existing limits would not bind man's fate,
If new accounts weren't kept by antique rules.

And yet man strives—There's always joy in sharing
Through tasks that minister to human needs;
There's challenge to inventiveness and daring,
But who meets out reward when man succeeds?

Is money—flow sole arbiter of fate?
Art calls finance to shape a better state.

V

Let those who slumber, while the nations race
To launch great missiles that may reach the moon,
Awake to find, arranging city space,
The problem that demands solution soon.

The gridiron streets that are but clogged-up lanes;
Dark piled-up walls, which one another press;
Space miscontrolled and held for paper gains,
And common ends ignored through selfishness;

Design for common uses that are needed;
Space rearranged and rights reorganized;
Concert of action free and unimpeded,
And change in scale of living recognized.

Faith in man's purpose; Fearlessness of sin;
A dedicated Spirit; Faith will win.

Library Notes

Concrete and Shell Roofs

HEREWITH are presented the titles of the recent books on concrete construction and shell roofs available in the Library. These may be borrowed by corporate members at the usual fee—fifty cents for the first volume and twenty-five cents for each additional.

G. E. P.

Concrete Construction

AMERICAN CONCRETE INSTITUTE

ACI—Manual of Concrete Inspection. 3d ed. Detroit, 1955. 232 p.

BILL, MAX

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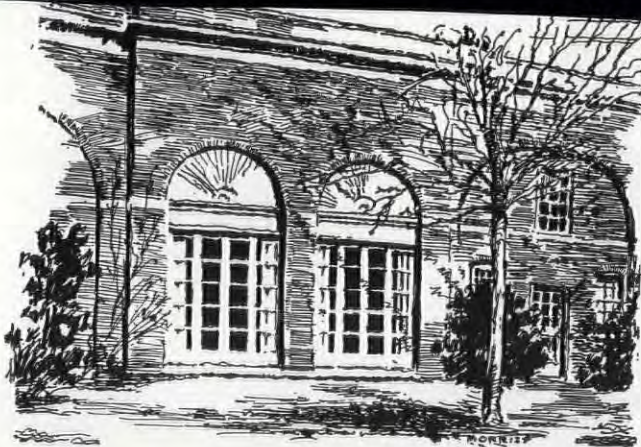
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Committee 315

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CONCRETE REINFORCING STEEL INSTITUTE

CRSI Design Handbook. 2d ed. Chicago, 1957. 447 p.

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Reinforced Concrete in Architecture. New York, Reinhold, 1958. 240 p.

WILLIAMS, CLIFFORD D. AND C. E. CUTTS

Structural Design in Reinforced Concrete. New York, Ronald. 1954. 308 p.

Shell Roofs

CEMENT AND CONCRETE ASSOCIATION

Proceedings of a Symposium on Concrete Shell Roof Construction. 2-4 July 1952. London, 1954. 258 p.

GIBSON, JOHN EDWARD AND D. W. COOPER

The Design of Cylindrical Shell Roofs. London, Spon, 1954. 186 p.

MACNAMEE, JOHN

Analysis of Symmetric Cylindrical Shells, Its Application to Civil Engineering Design. London, H.M.S.O., 1955. 84 p.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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TORROJA MIRET, EDUARDO

The Structures of . . . New York, Dodge, 1958. 198 p.

BOOK REVIEWS

PHILOSOPHY OF STRUCTURES. By Eduardo Torroja. 416 pp. 7 $\frac{3}{8}$ " x 10". 205 illust. Berkeley, California: 1958; University of California Press. \$12.50

This remarkable book by one of the world's greatest architect-engineers deserves something more than the usual book review. The translation from the Spanish is by J. J. Polivka and his son Milos Polivka. The senior Polivka is a consulting engineer and a long-time friend of Torroja. He has worked with Frank Lloyd Wright on the Guggenheim Museum, the Johnson Wax Tower, and other structures, and has authored several books on engineering subjects and served as consulting engineer on many structures in central Europe.

To sum up the book, we print here two items which were originally intended to be included in the book, but for various reasons had to be omitted: A Foreword written by Richard Neutra; and excerpts from the author's own Preface. We also include a few of the many illustrations.

ENGINEERING SEEMS to characterize our time and civilization more than anything else. But Eduardo Torroja, a world figure in his field of activities, shows that an engineer, far from any technical narrowness, can represent a new and broad wave of humanism. As director of the Instituto Technico, in a new ingenious group of buildings on a pine-studded hill overlooking the land near Madrid, Señor Torroja privileged me to be his guest, variously to lecture before his many friends in the lovely conference hall, dine with him in the circular dining room of his collaborators, and converse with him in the most interesting office of Spain. The building is called *Costillares*, that is "ribs," because of the intriguing pergola frames that surround its outer patio. A big dodecahedron coal bunker identifies it over a wide range of view as a non-traditional institution and an exciting venture in structure and purpose.

With all his specific mathematical technical genius Torroja is interested in human society and in man himself.

Our first human experience of stress, the subject matter of engineers and engineering is quite "natural." Our prototype of this experience is exemplified by the strains, the tensions, and the pressures in our own body, in our limbs and muscle packs. The triumph over gravity may have been spectacularly dramatized by great architects of various ages, but an infant turning toddler, standing upon his little legs, gathers his first, most intimate, most first-hand knowledge about the pull of the earth and about strains and stresses.

If we later in life and in professional engineering practice progress in related knowledge and perform on the basis of ever new findings, the primary basis for our penetration into this subject of "stress" is our inner perception, our inner sensings, which report to us every fraction of a second on the position and posture of our own body, the stress-distribution within it, the temporary deformations which outer mechanical forces, above all gravity, may work on it.

Great psychiatrists and experts in nervous physiology, like Dr. Schilder, have led me to a new recognition of that great and general significance which our own body image subconsciously holds for our entire outlook on the physical world and in particular on man-made structures around us. One could well claim that our understanding of the world and its structures is thus "anthropomorphic." We identify ourselves with rocks and trees, with beams and columns, and thus we understand them, their static balance or their dynamically disturbed equilibrium.

J. J. Polivka, who introduces his great Spanish colleague and friend Eduardo Torroja to American readers, believes himself in the "empathy," the "infeeling," which accompanies great engineering divination. Leading designers like Torroja and Polivka, like Freyssinet, Mail-

lard, Dischinger and Nervi seem intuitively to partake in the inner conditions of their created and formed structures.

Polivka, himself author of well-known engineering projects in Europe and this country, co-worker of first-rate architects in both hemispheres, a writer of great experience, appears the logical person to introduce the famous Spaniard to us. And it happens at a period when a young generation feels jaded by humdrum repetition of old architectural clichés never clearly to escape from two-dimensional static concepts.

True enough, every structure is three-dimensional, as is the space it encloses, but keeping away from the monopoly of isolated cross sections, carrying into design a fused *Gestalt* in space, a spatial shape, has been hindered by planimetric paper tradition and the initial oversimplification of yesterday's "calculated engineering."

In the dark Middle Ages when paper was scarce and shapes like vaulted ceilings of lofty cathedrals moved without much intermediate draftsmanship right into reality under the hands of creative workmen, the wisdom of our great engineers of today was foreshadowed. Stone quoins and bricks were neatly prefabricated, hoisted and assembled in fantastic integration. Yet with all our interest in prefabrication and gratitude for its ingenious progress, we must acknowledge the indebtedness of our period to the stimulation which the "one-cast," the continuous, the monolithic reinforced concrete construction has yielded. A new wave of integrated shape imagery started from there, as in Torroja's *Fronton Recoletos* or *Hipodromo* in Madrid.

America, the country of the great and daily engineering know-how, of streamlined structural procedure and speculative comprehension of its implications, should and will welcome Torroja's superb philosophy of structures which Polivka presents.

RICHARD NEUTRA



PODOLSKO BRIDGE OVER THE VLTAVA RIVER, LONGEST CONCRETE ARCH IN CENTRAL EUROPE.

BY WHAT PROCESS is a good structural design finally evolved? Although I have been asked this question many times, I have never known what to reply and I never shall. The laws which guide our thoughts toward the conception of a new solution remain unknown to us. Our imagination is constrained, guided, and attracted by a complex pattern of knowledge as well as feelings, ideas, and desires previously experienced.

Experience is a very important factor in solving design problems. But even though certain results of personal experience can be passed on to others, the very nature of experience itself cannot be communicated. We must seek our knowledge as much outside as within ourselves. Many concepts, previously unrecognized, are brought to consciousness and clarified by introspection. It is an intricate and complex task to order them into an harmonious system, to give each its just relative value, and to combine and balance them without neglecting any. This book has been written at odd moments, as an enjoyable exercise in searching and organizing one's own ideas: those ideas we utilize subconsciously or become explicitly aware of only when we decide to explore the depths of our minds. Only by synthesizing all the factors involved in designing a structure can we pretend to give a balanced and useful account of our creative design.

In order successfully to conceive and plan a structure or building of any kind it is necessary to investigate and to know all its reasons for existence, its major and minor capacities to resist and to bear. The technical literature abounds with theoretical works of a mathematical nature, but few publications are concerned with the various kinds of structures or the fundamental reasons for their existence.

Structural design is concerned with much more than science and techniques: It is also very much concerned with art, common sense, sentiment, aptitude, and enjoyment of the task of creating opportune outlines to which scientific calculations will add finishing touches, substantiating that the structure is sound and strong in accordance with the requirements. The nineteenth and twentieth centuries have produced such astounding advances in the structural field that ontological studies of stress morphology have been overshadowed and bypassed. At the same time it should be pointed out that any designer who disregards the principles of stress morphology may be in danger of serious failures. It is difficult to find in modern literature—many things a few decades old would be useless now—authors who have made a study of questions involved in this book. An attempt will be made to discuss the problem of structural design in its full generality, nakedness, and purity.

The primary functions of all structures can be summarized as follows: To enclose a certain space and to protect it from the natural elements of wind, rain, snow and earthquake, from changes of temperature, and from noise; to provide passageways for the movement of persons and vehicles; to resist the lateral thrust of earth, water, or other fluids. Also many other equally essential considerations must be taken into account, such as surfacing, natural and artificial illumination and ventilation. Resistant function is very important. Here the word refers to the entire complex of conditions necessary to ensure total or partial immobility—static equilibrium—for a long period of time.

Every constructional problem is conditioned essentially by a final purpose, important secondary requirements, and by material means available for its accomplishment. A structure should comply with conditions and limitations of economy. Certainly, there are reasons for sumptuary buildings and structures. It is difficult to evaluate the human man and social reasons for luxury. There are exceptional cases, but in general it can be stated that the greatest economy should always be observed and respected. However, the solution of this problem depends on many factors, as degree of safety, the life of the structure, the possible future uses planned, esthetic appear-



THIN SHELL OF THE MADRID RACE COURSE, 2 IN. THICK.

ance, etc. We shall see ultimately how in many of these problems logic and mathematics can be instrumental to the common sense and the balanced consideration by which our judgment should always be guided. The factor of economy commands special consideration in the present era of materialistic viewpoints and habits. But it is not always the determining factor at all. It very often happens that a small cost increase results in considerable gain of strength in construction.

More apt to our subject, and certainly of fundamental importance, is the esthetic aspect of construction. There are monumental buildings in which esthetic considerations govern the basic design; and others, like industrial buildings or utilitarian structures that are out of sight, for which the esthetic factor can be neglected

or omitted altogether. But even so the effect of esthetics must be initially considered in every case.

Out of this heterogeneous complex of considerations and factors, the study of the problem to be resolved by the designer should emerge. It must be realized that the designer must deal with certain specific materials and with construction methods and procedures.

Other important factors are the construction site and the time required for the completion of the building, financing and budgetary arrangements, interest on the capital successively invested during construction and the expected income of the completed building. The characteristic properties of materials used will influence the structural type to be selected. Construction methods are also variable for each specific material; and the appearance of the structure and its resistance to external factors, e.g., weather conditions, will largely vary with the type of material used. In the selection of materials should be taken in account also availability and economy of the common and skilled labor, available mechanical equipment, number of identical structural parts, etc.

In conclusion, every building will have its own course of creation influenced by its bearing capacity and resistance, its economy, its construction site, and last but not least, a more or less pronounced esthetic interpretation and presentation. All these requirements and factors should be continually interconnected. It will be essential, when one question is discussed, to refer simultaneously to others. Only when all are integrated will it be possible to achieve the best conclusion or solution to the problem at hand.

EDUARDO TORROJA

ARCHITECTS' YEARBOOK 7. 220 pp. Illus., Plans. 7½" x 10". New York: 1956: Philosophical Library. \$10.00.

This English annual follows much the same pattern as the earlier volumes. Among the articles on the philosophy of architecture is that by Gordon R. Taylor "Psychol-

ogy, Architect and Patron." He suggests that art will be effected by the society in which it is produced—whether matrist or patrist. After a brief survey of this theory as tested by the past, the author offers comments on the current situation.

Erno Goldfinger has written a brief sketch of Auguste Perret's life and work, amply illustrated and with a list of works. G. C. Argan considers the work of Italian architect Ignazio Gardella. Recent work in Brazil and Finland is reviewed by Gordon Graham and Marius af Schultén respectively. The latter is the more generously illustrated and covers a wide variety of buildings.

City planning is treated in two articles on "CIAM 10" by A. & P. Smithson and Theo Crosby. Other subjects covered are exhibitions and design, and recent British work in the field of houses; apartments and schools.

Among the technical articles there should be mentioned those by J. B. Dick on "Natural Ventilation Systems" and by Thomas Stevens on "The Heat Pump."

An interesting assemblage of papers on architecture, with a wide variety of appeal.

G. E. P.

SWEDEN BUILDS. By G. E. Kidder Smith. 2nd revised ed. 270 pp. Illus. 9 x 11½. New York: 1957: Reinhold Publishing Corp. \$10.00.

To those already familiar with the various books by Kidder Smith this will need no introduction. To those who do not already know them, this will provide a good opportunity of becoming acquainted.

Mr. Smith received his architectural education at Princeton, has traveled extensively and has had his own practice since 1947. He is well known for his color slides and photographs. His books include "Brazil Builds" with Philip L. Goodwin, "Switzerland Builds," "Italy Builds" as well as the first edition of the present title.

The major addition in this edition is a twenty page section on Vällingby the new town section of Stockholm. This new city for

23,000—completely planned from beginning to end—has many lessons for all contemporary planning. The selection of Mr. Smith's photographs offer a vivid portrayal of the new community.

Another new feature of the book is an essay "The Structure of Stockholm" by Sven Markelius, which considers its problems and makes recommendations on its future.

Twelve new buildings are illustrated and described under various types, while to compensate for the new material, twenty-eight have been omitted, including the entire section on shops and offices. The net result is a book smaller by nine pages than its predecessor. It is interesting to note that this new edition follows the original rather closely in general format and layout, although the first was printed in Sweden and this in the United States.

An excellent presentation of buildings in Sweden which has been outstanding in its modern architecture. G. E. P.

Recommended Reading

"America's Super-Cities" is the title of an article by Christopher Tunnard in the August *Harper's Magazine*. The author is, as most of our readers know, the Director of the Graduate Program in City Planning at Yale. His argument is that the standard conception of "city planning" is obsolete, based as it is upon the old garden city or satellite city idea. With the gradual welding together of vast regional areas, such as that stretching from Portland, Maine, to Newport News, Virginia; or the Los Angeles-San Diego region which will soon stretch its tentacles to lock with the Bay Region, a new concept of planning for these super-regions must be found.

Tucked in the bottom corner of page eight of the same magazine, under "Letters to the Editor" is a brief note from FLW, giving his opinion of caricaturists who write and editors who print it!

THE EDITOR'S ASIDES

I AM GOING to take the liberty of quoting from the July-August issue of the *Journal* of the Architectural Association of London without yet having asked permission to do so. Peter Smithson is talking about the Yerbury Foundation:

"It would be a pity if the money available for the general use of the Architectural Association School was simply wasted by being given away in the form of an ordinary scholarship. Scholarships are usually given either as a present for work already done, which is a nice idea, or given for 'research.' Unfortunately very few people are capable of individual radical thought, i.e., ideological research, and technological research needs to be directed by an obsessionist through many individuals if it is to be successful. It is significant that one rarely hears again from the many people who have been given money to do architectural research.

"The only way I can think of which might be valuable is to offer a sum such as £250 for a week of intense communication of his ideas by a man whose ideas have already reached and influenced us all: such men as Costa, Niemeyer, Kahn, Johnson, Eames or Scharoun. The idea would be for him to be able to project himself directly both to the students and to the membership through say, two formal lectures, two seminars and through normal social intercourse . . .

"The sum of money may seem large for such a short period but most of it would be eaten up by travel expenses and so on. The main advantage of the idea is that it would enable one to get a person who is busy with his own mental and practical life and would be unwilling to give a longer time to a School, and it is well known that most people can say all that they have to say in a very short time and if they are here in person the overtones of their ideas can be got directly from experiencing the man."

The idea as advanced is excellent

for schools of architecture, but it is even better for Chapters. Any fair-sized Chapter should be able to afford to import such men as Louis Kahn, Philip Johnson, Carlos Contreras, or Minoru Yamasaki to their territory and set up a series of three or four talks and discussion groups, interspersed with plenty of informal social mingling and bull sessions. The intellectual stimulus to all generations in the Chapter should be tremendous—a shaking up for the older men, new directions for the middle group and pure inspiration for the younger members. And nobody could plead that he didn't have time, for the time lost from the office would be negligible. Any member who didn't participate would be the kind of a guy on whom it would be wasted anyway.

THERE ARE SOME astute observations on the dying downtown areas of our cities in the August issue of the *Bay State Architect*, publication of the Massachusetts State Association. The column is unsigned, so one would assume it was written by the Editor, Samuel Eisenburg. He says, in part: ". . . All this poses a serious problem to the cities and towns whose tax revenue becomes sorely depleted as the commercial areas drop in value, and ultimately, many of the properties are taken for taxes.

"In a shopping area very close to Boston, which for many years was good profitable commercial property, a recent count indicated that out of 42 retail units, 26 were vacant. As these vacancies began to occur, the different properties had "To Let" signs on them. Now most of them have "For Sale" signs displayed, and the next move is that the owners will have to abandon the properties, and the town government will have to take them for non-payment of taxes. A situation such as this is not good for any community. The buildings are permitted to become dilapidated, and even when the municipal government takes it for taxes,

no one wants to purchase the property because it will not stand the investment of venture capital."

It is possible that a great benefit might ultimately be derived from such a situation—granted an all-wise and far-seeing town government. Through the acquisition of contiguous properties and the condemnation of those few still struggling on in private ownership, the town would be in a position to call in the planners and re-plan the area, re-creating it as an industrial, commercial or residential area as conditions and needs dictated, ultimately selling back to private investors what should then be highly desirable property. This is by no means an original observation, yet it is one which can bear repetition.

A PRINTER'S DEVIL played a dirty trick on me last month and I want to get even with him by exposing him—and also thereby squaring myself. In the second sentence of the sixth paragraph of my lament for the east side of Cleveland it says: "The city was cleaned up and done the best job it could with its long-neglected Mall . . ." Believe it or not, in my original copy, in the galley proofs, and in the page proofs it said "The city *has* cleaned up, etc." In correcting other nearby typographical errors, the typesetter changed that "h" to a "w"!

I HAVE BEEN HOPING that some readers would accept my invitation put forth in the June issue to send in sketches, designs, photographs or whatever, for the *Journal* covers. The design should occupy the panel where the photograph is on this issue, or it could also include the top banner which contains the words "*JOURNAL* of The . . ." etc., which would then be over-printed on the design. No prizes offered, but plenty of publicity!



AMERICAN ARCHITECTURAL FOUNDATION
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SCHOOL PLANT STUDIES

A Hat In The Ring

William M Davis, (AETA)

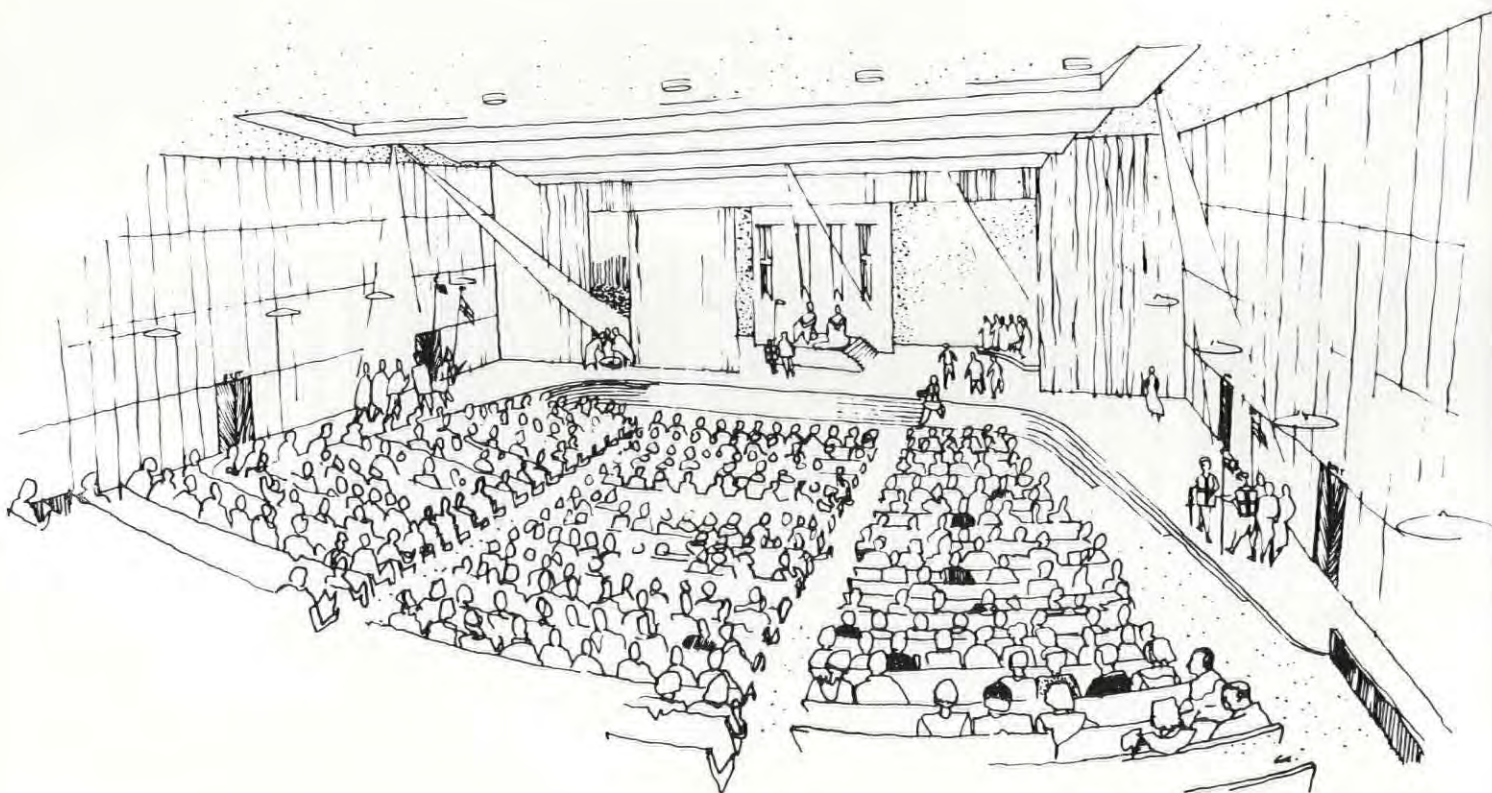
- FUNCTIONALISM
- THREE PROBLEMS
- PEOPLE WHO KNOW
- BASIC REQUIREMENTS
- MULTI-PURPOSE AUDITORIUMS
- REHEARSAL ROOM—ORCHESTRA PIT
- THE IMPORTANT DIMENSION

THIS IS THIRTY-THIRD OF A SERIES OF PAPERS PREPARED BY MEMBERS OF THE AIA COMMITTEE ON SCHOOL BUILDINGS, & BY SELECTED SPECIALISTS, TO MAKE LAYMEN AWARE OF SCHOOL BUILDING PROBLEMS & TRENDS & TO STIMULATE DISCUSSION. THEY ARE NOT INTENDED TO BE DEFINITIVE LAST WORDS & CARRY ONLY THE AUTHORITY OF THEIR RESPECTIVE AUTHORS. THE SERIES WILL BE EDITED BY THE COMMITTEE & ISSUED BY THE AIA DEPARTMENT OF EDUCATION & RESEARCH UNDER SPONSORSHIP OF THE AMERICAN ARCHITECTURAL FOUNDATION. MANY NEW SUBJECTS ARE BEING WORKED ON & CONTRIBUTED ARTICLES ARE WELCOME. WIDESPREAD DISTRIBUTION TO LAYMEN & EDUCATORS IS MADE OF THESE NON-TECHNICAL ARTICLES IN REPRINT FORM.

(one copy each issue free—additional copies 10¢ each)



Bursch & Reid



DESIGN SKETCH FOR AUDITORIUM (1000 SEATS) SHOWING FLEXIBLE SIDE-STAGES FROM HIGH SCHOOLS TODAY AND TOMORROW, BY CHARLES W. BURSCH AND JOHN LYON REID, FAIA (REINHOLD 1957), AN EXCELLENT NEW BOOK.

A HAT IN THE RING

by William M. Davis, American Educational Theatre Association (AETA)

This is first of a new series of School Plant Studies to be devoted to the educational theater, contributed to us by members of AETA. It is a general introduction to school theatre planning to be followed by other studies of special areas and features. This welcome collaboration is typical of work being done for the Institute by the AIA Committee on School Buildings and Educational Facilities in its liaison program with other organizations.

Mr. Davis, after several years work with an arena stage (which, with the tone of his comments, suggested the title of this paper), is now back with a traditional proscenium theatre.

IN NOVEMBER OF 1933 I began to work on a play for college production. Now as I write this it is 25 years and about 200 productions

later. Not once in all that time has an architect ever asked for my advice or opinions on how a theatre might be planned so that it would function efficiently, economically, and put on technically excellent productions. I mention this because it is not the exception but the general experience of members of AETA, teachers in this field.

The owners may have told you they were satisfied—you have to please them. But why are most theatres in America so poorly planned? So difficult to work in? So wasteful of money, time and effort? Technical directors, scene-designers, light designers, costume-designers, carpenters, electricians, seamstresses have to work in cramped quarters. They throw away scenery because there is no place to store it. They vote against fine

plays because they require more than two sets and there is not enough off-stage space to stack furniture and scenery. (Ed: Actors are different—in school at least they are so hopped up, starry-eyed and full of lines that little else matters!)

FUNCTIONALISM

In planning a house who would place a bedroom between dining room and kitchen? It isn't functional—which is to say, it *will* work, but how awkwardly! We have plenty of theatres planned this way. Would you plan a bedroom or dressing room in a house without closets? There are literally hundreds of theatres in this country (mostly high-school) with no space whatever for storage of costumes. This means that costumes must be rented, which costs money. How many of you have ever talked with someone who

has designed or made costumes for plays? I mean the people who know the areas and dimensions required—know them because they work there, because they turn out costumes in these rooms. Your answer most probably applies to all the other practical workers in the theatre: the stage crews in dungarees who must cope with conditions imposed on them by their buildings.

THREE PROBLEMS

Let me list those things which are out of the control of everyone: architects and technicians alike. 1st—not enough money. 2nd—a poor plot of land to build on. 3rd—a board of trustees, or similar group, who labor under the impression that if the theatre is imposing on the outside, it is obviously excellent backstage. (None of these people has ever been backstage.) One or more of these three things have spoiled hundreds of theatres, but I believe that only the second reason (poor site) is beyond any hope.

Not enough money: Here things can be improved over a long term by making sure that what money is available goes into construction, not equipment, and *especially not into interior decoration*. To change the plan of a building after it is up can be pretty expensive, so it is much better to build it right in the first place. Buy the wood paneling later.

The *site* may be chosen before the architect enters the picture—if this should not be the case, even the general outlines of the proposed building will indicate what sort of plot is needed.

An ignorant *donor or board of overseers*: This is really tough. I have in mind a university which was left a large sum to be applied toward construction of a new theatre—with one string attached. It must have a gold dome. Now, there is no doubt that this will certainly be a glittering shrine of the drama—but *domes*—all this glisten will NOT be gold in the mind of the electrician who must worm his way on his stomach, across 2x4 scaffolding above the auditorium ceiling under that stupid dome framing, pulling a spotlight with him to attach to the front lighting set-up—and then go back and make the same

trip again with cable to hook it up to an outlet. This sort of thing can take as much as half an hour instead of ten minutes. This is a 200% increase in work time and when multiplied thruout the building, it is easy to see why all the available time is used up just accomplishing basic tasks. The building was not planned with the realization that such work was going to be done.

PEOPLE WHO KNOW

Everyone who has not had to cope with tiny offstage spaces or obsolete lighting setups believes that form (in the esthetic sense) is more important. If function does enter their minds it refers to the size of the lobby (and its decorations), rugs in the aisles, wall hangings, and of course, wood-paneled offices. There will be several bronze plaques imbedded in the lobby—too bad the money ran out before we could get all the lighting instruments you said you wanted but why is it so dark on stage?

If the front offices are Elizabethan for some reason it follows that the scene construction crews will be able to build excellent sets (wherever they do that sort of thing). In the rare cases where someone does remember that a crew exists and does ask them—their suggestions are scrapped because they just don't rate an Elizabethan office and besides there's paint on their jeans. Just the same, loud and critical static is heard when the crew cannot do as well as expected after they have been handed this brand new building. A solid gold Cadillac is a splendid looking item—but it won't run. No one remembered to ask the mechanic what his years of work on motors told him about the suitability of gold piston rings. I suggest that more grimy workers be consulted. The trustees may still want this area omitted or that one changed but at least they should meet people who can say, "Look, I've actually done this kind of work, I've budgeted and spent management money on it, and I know your suggestion will slow down production. You can incorporate it if you wish, you certainly will get poorer players and poorer educational results."

How can we make the front-office people in a university or highschool understand that there are teachers back-stage endeavoring to produce *educational* theatre and inculcate in students good habits of thought and practice? There are several ways:

- you can say so
- you can consult these people—when suggestions are made that appear to be to their detriment you can point out that they say they require something else
- you can request that designers and technicians attend meetings at which plans are discussed
- you can suggest that a theatre consultant be retained
- you can retain him yourself
- you can look at some good and bad examples of theatre architecture in your region

Let me say a word or two about these examples. Unless you worked in dramatics in college you will not know a good backstage layout from a bad one. The solution is simple. Ask the people that you find *working* back there. Don't ask the school or building superintendent—ask the harassed English teacher. He'll tell you—plenty, I expect. Explain who you are and what you want and I'll guarantee he'll give you all the time you want, all the help you want, free. The advice you need is close by, as near as the nearest college or civic theatre—and in many highschools as well. We must have good facilities to teach well.

BASIC REQUIREMENTS

These are not necessarily in order of importance but they are items that will help to produce economical and effective plays. They will allow for teaching theatre as well as the college says it is taught!

Storage space: Scenery, costumes, furniture and hand properties, lighting and sound equipment all have to be kept somewhere. The stage IS NOT A STORAGE SPACE. That area is used for performances. Some other place must be provided and this storage space is needed in order to save time and to save money. You do not have to lay out cash for materials to build a flat if the flat already exists. You do not have to take several hours to build and cover a flat if the flat already exists. Economy, plain and simple. And it follows that you then have free time

and money to produce better shows, to spend for educational values.

This storage space must be in the *same building* as the shop and stage. By chance as I write this, it is raining outside. Providentially I have not scheduled crew trips across the college campus where I work to the dormitory basement where our furniture is kept. Upholstered furniture and newly painted scenery do not go out in the rain. It takes longer to make these trips than to move from one room to another. Economy of time again. If a truck is hired—more money is spent and trucks are not available at any time of the night or day, seven days a week. (This indicates that technicians work seven days a week: they certainly do—they have to overcome limitations of their theatre!) The same situation occurs when the play is over and various items are being returned to storage.

The storage areas must be of the *right shape*. Most important item to note here is that for costumes, properties, and lighting equipment, the ceiling does not have to be higher than 8'—you cannot lift items higher than that. For scenery—and please note my change in wording—there does not need to be more than 12' of *clear space*. 10' is often quite satisfactory. Be sure that doors are large enough and in right places so that items which are supposed to be stored can be brought in and taken out. Even foam rubber sofas have too many bones to bend around sharp corners.

Storage areas of the *right size*. The size of furniture and hand property storage can be dismissed in a word: infinite. Provide as much as you can. Lighting and sound equipment storage can be quite small because most instruments are left in place on the stage. Equipment and accessories are put in the light-storage room.

Costumes have a basic section module of 6'x6'. This provides for the width of a row of costumes, plus a wide aisle, sufficient to move down with your arms full, and it is high enough so that long costumes will not drag on the floor. In addition to the racks, there must be plenty

of rooms for accessory storage: belts, stockings, feather boas, and usable scraps of all kinds.

There is usually a maximum size desired for *scenery* storage, but it depends on the theatre program and the preferences of the scene technician so that it is not practical here to give comparative sizes. In any case, it probably won't be large enough; it never is.

Accommodations for those *people* who work on a play—*actors*, for one group: A dressing room is not just a small room. It is specially planned for the special operations that happen in it. It has specific dimensions, depending on how many people will use it. It has a sink, to help wash off makeup. It has ventilation, and this is important, for acting in makeup is a sticky, sweaty business. Dressing rooms should either have windows opening to the outside or mechanical ventilation. Ask *any actor*.

Crew members, for another group—they need lockers to keep their street clothes in while they are working. They need showers to wash off the dirt they acquire. They need a room in which to change their clothes. In addition, in colleges and universities, they need a room to study in during the long periods of waiting in the evenings. There will be classes tomorrow.

Adequate *access* to the theatre for trucks and materials. This is particularly important if touring companies go out, or if outside groups come in. Can a tractor-trailer full of scenery, lights, and costume trunks back up to the stage door and unload at a proper dock? Remember, this operation must be scheduled weeks in advance and cannot be postponed because of poor weather. Can 16' lumber be brought directly to the shop without going thru the auditorium? Can rubbish be removed from the shop without rolling or trucking cans thru a classroom?

Be sure the plans for the *shop* show plenty of clear wall space. A good shop should have an aggregate of 50' of blank wall—it can be in several sections. This is needed to lean scenery against, and a scene-unit can be 20' long. Also, a power saw

requires, for the most efficient operation, a clear wall space of 24'. This will enable it to handle lumber up to 16' long.

When planning various hanging positions for *lighting instruments*, be sure you have also planned so that electrician can get to them, and once there can adjust them. Final focusing must be done with instrument in place and it is nearly impossible to train Brazilian snakes to do this job. I have several times put on plays in a highschool theatre where only access to auditorium lights was by scaling a ventilating tunnel, walking across a small beam and finally going head first thru a small hole not more than 12" x 18". A New England college that I know of has an access shaft to the beam lights so small that the larger students cannot go up. Once arrived at a lighting position, workers must be positioned securely enough so that they can use both hands to work instruments.

MULTI-PURPOSE AUDITORIUMS

Be careful with auditoriums which, "of course" will have provision for movies (or TV). Multipurpose auditoriums may be an economic necessity but the purchasers of such edifices are not getting two-for-the-price-of-one. They are getting about one and two-thirds. And it is always the theatre which is the two-thirds. Movie projection is a precision operation: projector and screen both must be located in fixed spots and kept there. Theatre operations have to work around them. Extra work is involved in taking down sets and putting them back up so that movies can be given. I think that no-one ever cancelled a movie because there was a set on stage. Down it comes. Roughly speaking, I would estimate that when a movie set-up is included in plans for a theatre, about one play less per year can be produced because of time lost in working around the movies. Backstage facilities are also cut down. None of this can be avoided in this pernicious combination but it is important that school committees realize it. Two different types of entertainment cannot occupy the same place at the same time.

REHEARSAL ROOM — ORCHESTRA PIT

A new college theatre often means an upturn in theatrical activities. Often two shows will be working at the same time. The second will be working in a *rehearsal room*—a definite need. Dimensions are obvious and standard: 4' larger than acting area of stage. This is so actors can be offstage, so to speak, and so that director will not be encroaching on areas that actors must move thru. Since there is often shouting in a play, the rehearsal room should be some distance away from the stage.

If an *orchestra pit* is planned, the number of musicians that it will hold must be made quite clear to the board of trustees. And there must

be access to it. I know, I know, *of course*, there will be access! Fine—have you remembered that a piano must be moved in and out of the pit? Did you know that double-bass viols cost up to \$5000, so that they are not casually bumped along behind the player? How many of you have ever handled that most awkward of all instrument cases—a harp case?

THE IMPORTANT DIMENSION

Preliminary planning of the theatre includes a decision on how many people the auditorium will accommodate. This figure is arrived at by estimating the number that will come to all performances of one production, and then dividing by the number of performances. Auditorium

capacity and depth available for seating are two determinants of the width of the proscenium. Now here is the important item: This width, this distance, is the first concrete dimension that can be put on paper. It is the first cause, to borrow a phrase from philosophy. The rest of the entire building devolves from this dimension.

So help me, if you do not start with this particular dimension, you're just wasting your time. Sooner or later you will arrive at that point, of course, and then you will find that much of what you have already done is thrown out of whack, and you have to do it all over again. Begin at the beginning: the proscenium. It affects the entire structure.

PAINT—AIA File No. 25

AIA Index to Architectural Information

THIS INDEX has been prepared through the joint cooperation of the National Paint, Varnish & Lacquer Association, 1500 Rhode Island Avenue, Washington, D.C. and The American Institute of Architects as an early pilot study of technical inclusions in the proposed AIA Index to Architectural Information.

In 1956 the AIA Board of Directors established a sub-committee of the Committee on Research to study the problem of location of needed authoritative background information on subjects related to the practice of architecture. The sub-committee, under the chairmanship of Marvin R. Patterson, Washington State Chapter, has worked long and diligently to propose a workable program designed to be of maximum assistance to anyone concerned with planning, design, or construction.

While the format and annotations of the following study on paint is not of the same form and arrangement as expected for the published Index, the technical content collected for the first pilot study may be considered current and authoritative.

It is proposed that this service will be expanded to encompass all subject matter relating to the practice of architecture and to be indexed in such manner that informative literature will ultimately be available from local sources. AIA Library loans of portions of this material can be presently made to members on an individual basis.

This pilot Index is intended to list the best available information on types of paint to select and factors bearing on the selection and use of paints such as surface preparation and methods of application. It does not deal with the technical aspects of the manufacture of paints.

In general, references presumed to be of most use to architects have been supplied, even though some of the information is out of date. Since the publications of this type are not numerous, a number prepared by commercial concerns are included. These are, understandably, tinged with a certain bias, but when due allowance is made for this, much useful information of a general character will be found.

Some references are relatively old, and many of these do not deal with currently available materials. In these cases, the omission of mention of some modern material should not be taken as derogatory. Older references are included in the absence of anything better and because they contain such information still valid on surface preparation, application, and conditions of use.

It is hoped that the inadequacy of references in some sections will stimulate the preparation of suitable booklets dealing with those phases of the use of paint.

General Texts & References

ALUMINUM PAINT & POWDER—J. D. Edwards & R. I. Wray. Reinhold Publishing Corp., 430 Park Avenue, N. Y. 1955. \$4.50 219p

primarily concerned with properties of aluminum powder & paint, but use of aluminum paint for painting of aluminum is discussed, p 98 & magnesium, p 101—hereafter referred to as **Edwards & Wray**

NATIONAL PAINT, VARNISH & LACQUER ASSOC., INC.—1500 Rhode Island Avenue, N.W., Washington 5, D.C.—hereafter referred to as **NPVLA**.

PAINT MANUAL—US Bureau of Reclamation. US Govt. Printing Office, Washington 25, D.C. 1951 \$1.25 203p

selection & application of paints is discussed from point of view of Bureau of Reclamation but many types of surfaces are covered—hereafter referred to as **Bureau of Reclamation**

PAINT MANUAL—Corps of Engineers, July 1956. US Govt. Printing Office. 147p 75¢

for new construction and maintenance, keyed to Federal specifications

PAINT MANUAL WITH PARTICULAR REFERENCE TO FEDERAL SPECIFICATIONS—Percy H. Walker & Eugene F. Hickson (Building materials & structures report BMS 105.) US Govt. Printing Office, 1945 \$1. 165p

lays particular stress on federal specification paints. Somewhat out date, but contains much useful material—hereafter referred to as **Walker & Hickson**

PAINT & PAINTING—Bloomfield, Bulletin of the American Institute of Architects, Jan-Feb. & Mar-Apr., 1956. 50¢

PAINT SPECIFICATIONS—E. I. du Pont de Nemours & Co., Wilmington, Delaware. no date 72 pp. \$4.00

general descriptions of products and suggested specifications for various surfaces.

PAINT SPECIFICATIONS—a modern guide, Painting & Decorating Contractors of America, 540 N. Mich. Blvd. Chicago. 1957 48p. \$5.00

PAINTING & PAPERHANGING FOR THE HOME OWNER—Charles B. Moore, Garden City Publishing Co., Garden City, N. Y. 1949 \$2. 188p

designed primarily for user of paints but contains much useful information on selection of paints & preparation of surfaces—hereafter referred to as **Moore**

PROPERTIES OF COATING—Tech. Bulletin No. 229, Bakelite Co. 30 E. 42nd St. New York 17, New York. 1957, nc, 5p

quality ordinarily expected from coatings using Bakelite products

STANDARD DEFINITIONS OF TERMS RELATING TO PAINT, VARNISH, LACQUER & RELATED PRODUCTS. ASTM D-16, 5 p

STEEL STRUCTURES PAINTING MANUAL—Joseph Bigos, editor. Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh 13, Penn.

vol I. Good paint practices 1954 \$6 423p. relative merits of various systems for various purposes are discussed

vol II. Systems & specifications 1955 \$6 291p. specifications for a number of paints & suggested systems are described—hereafter referred to as **Bigos**

Interior

CONCRETE, CINDER BLOCK, & BRICK

ACI recommended practice of application of portland cement paint to concrete surfaces (ACI 616-49) American Concrete Institute, 18263 W. McNicholas Road, Detroit 19, Michigan. 50¢ 16p.

standard recommended practices for use of portland cement paint are covered. Recommended practice for other types of paint for concrete is in preparation.

Bureau of Reclamation: p 135-156

Painting Concrete—NPVLA 1958, nc 16p.

reasons for painting, selection of paint, and application techniques

DRY WALL

no satisfactory discussion available

METAL

aluminum & magnesium

Edwards & Wray:

Walker & Hickson: p 92

copper, brass, & bronze

Maintenance, cleaning, finishing, & coloring of copper, brass, & bronze Copper & Brass Research Assoc., 420 Lexington Avenue, N. Y. 17

iron & steel

Bigos:

Bureau of Reclamation: p 64

PLASTER

Painting Plaster—NPVLA 1958, nc 8p. Common causes of troubles, and methods of avoiding.

Moore: p 71-86

Bureau of Reclamation: p 139-140

Walker & Hickson: p 84

WOOD

cabinet work

Science of modern wood finishing—Deniston. Research Press, Inc., Dayton, Ohio. 1949 \$7.50. 386p.

floors

Modern floor finishing—Vanderwalker, S. C. Johnson & Sons, Racine, Wisconsin. 1931 \$1. 84p Many modern materials are not included.

What to Use on Floors. Federal Varnish Division, Ashland Ave. at 29th Street, Chicago 8, Ill. no date. 48p. nc.

Good suggestions on surface preparation and application, and also description of various materials.

trim

Moore: p 37-41

Walker & Hickson: p 78-81

Painting Hardboard—NPVLA 1958, nc 12p. Selection of paint and application techniques—interior and exterior.

MISCELLANEOUS

acoustic tile

Effect of paint on the sound absorption of acoustic materials—V. L. Chrisler (Research paper of National Bureau of Standards RP 1298) US Govt. Printing Office, 1940. 10¢ 28p.

effect of paints on various types of acoustical tile is discussed. Somewhat out of date, in that modern types of tile & paints are not covered.

Specifications for Painting Acoustical Surfaces—Anon. National Chemical and Manufacturing Co., 3617 South May St., Chicago 9, Ill. No date. 4p.

instructions for using a casein emulsion paint on acoustical surfaces. Recommends one product but general instructions are good.

fabric

Moore: p 74

Exterior

WOOD

siding

How to paint your wood home NPVLA 1955 nc 24p.

selection of paint & application techniques are discussed

Wood siding, how to install it, paint it, care for it—Forest Products Laboratory (US Dept. of Agriculture, Home & Garden Bulletin no. 52) US Govt. Printing Office, Washington 25, D.C. 1956 19¢ 14p.

general instructions on installation & care of wood siding, but considerable emphasis on selection & application of paints.

trim

Moore: p 100-101

floors & decks

Moore: p 109

natural finish

Natural finishes for exterior wood—G. G. Sward (Sci Sect Circ 771) NPVLA 1955 nc 4p

performance of number of natural finishes is reviewed

METAL

iron & steel

Bigos:

Bureau of Reclamation: p 45-125

aluminum

Edwards & Wray: p 98

galvanized iron

Bigos: Vol. II, pp. 115-9

A specification for one type of paint, usually regarded as best for this service, is given.

magnesium

Edwards & Wray: p 101

copper, brass, & bronze

Copper & Brass Research Assoc:

MASONRY

walls

Painting Concrete—NPVLA 1958, nc 16p.

Outdoor exposure test of paints for exterior masonry walls—Clara Sentel (Sci Sect Circ 609) NPVLA 1941 nc 8p. Modern finishes are not covered.

Bureau of Reclamation: p 135-156

Walker & Hickson: p 81-84

Moore: p 122-130

floors & decks

Walker & Hickson: p 85-86

Moore: p 128

swimming pools, etc.

Moore: p 126

MISCELLANEOUS

glass

fabric

Moore: p 131

asbestos-cement siding

Painting Asbestos Cement Products—NPVLA 1958, nc 12p. Selection and application techniques for shingles, sheets, and corr. board.

Moore: p 130

Marine

WOOD

IRON & STEEL

Bigos: vol 1: p 260-289

Industrial Atmospheres

INDUSTRIAL MAINTENANCE

metals

Bigos: vol 1: p 350-390

wood

SPECIAL CONDITIONS

Protective coatings—Kenneth Tator (Chemical engineering 59, no 12, 144-90) 1952

discussion of resistance of special corrosive conditions of various organic coatings. Directory of trade names & producers is given.

General

PROTECTIVE & DECORATIVE COATINGS—J. J. Mattiello, editor John Wiley & Sons, N. Y. 5 vols 3370p (out of print)

primary reference source for information on paint & paint materials. Written largely in technical style & for paint technologist, but most authoritative source of information—hereafter referred to as **Mattiello**.

WHAT YOU SHOULD KNOW ABOUT PAINT—E. M. Fisher. National Painters Magazine, 30 Church Street, N. Y. 7 1953 \$2.50 184p.

popular discussion of nature, properties, & uses of various types of

paints—hereafter referred to as **Fisher**

note: there are a large number of excellent books on technology & manufacture of paints, but relatively few describing types of paints from users' point of view

Solvent-Thinned Coatings

TRANSPARENT

oil

varnish

Fisher: p 80-93

lacquer

Fisher: p 136-138

Mattiello: vol III; p 497-610

shellac

Mattiello: vol I; p 259-291

stains

Mattiello: vol III; p 769-813

Deniston: p 70-104 See conditions of use

OPAQUE

oil-based

Fisher: p 1-21 See also conditions of use.

varnish-based trim paints

varnish-based floor & deck paints

Bureau of Reclamation: p 26

Fisher: p 131-132

varnish-based interior wall paints

Walker & Hickson: p 84-85

varnish-based enamels

Fisher: p 129-131

bituminous coatings

Bureau of Reclamation: p 11-14

Roof coating manual—John C. Moore & W. M. Lawall (Sci Sect Circ 765) NPVLA 1954 nc 20p

OPAQUE, CLASSED BY PIGMENT

aluminum paints

Edwards & Wray:

anticorrosive paints

Bigos: vol 1, Chap. 4 See conditions of use

Water-Thinned

PORTLAND-CEMENT PAINTS

ACI standard recommended practice ACI 616-49. See conditions of use, (the appendix discusses composition & properties of these paints)

LATEX PAINTS

Fisher: p 101-120

Latex Paint—NPVLA 1958, nc 6p.

Latex Paint—Dow Chemical Company. 1958. nc 18p.

BITUMINOUS EMULSIONS

OTHER WATER-THINNED PAINTS

Miscellaneous Materials

PUTTIES & CAULKING COMPOUNDS

Facts about glazing—John C. Moore (Sci Sect Circ 735) NPVLA 1949

types & uses of putty are given

Caulking compound manual—John C. Moore & Willard M. Lawall (Sci Sect Circ 770) NPVLA 1955 nc 12p

types & uses of caulking compounds are given

PAINT & VARNISH REMOVERS

WOOD PRESERVATIVES

Preservative treatment of fence posts & farm timbers—J. Oscar Blew, Jr. & Francis J. Champion, US Dept. of Agriculture (Farmers' Bull, 2049) US Govt. Printing Office, Washington 25, D. C. 1952 15¢ 33p

methods of treatment, merits of various treating procedures, & composition of preservatives are discussed

MULTICOLOR FINISHES

Architectural Multicolored Enamels—Mass & Waldstein Co., 2121 McCarter Highway, Newark 4, N. J. Tech. Data Bull 521. no date. 4pp. nc.

Properties and suggested uses of multicolored finishes are given.

Special Requirements

Fire retardant paints—Chem & Eng News, 31, 3730-5 1953

summary of symposium on fire retardant paints, before American Chemical Society. Somewhat technical for average user.

Development of Fire Retardant Paints and Paint Systems. Corps of Engineers. Office of Technical Services, Washington 25, D. C. 1952. 121p \$3.25

a technical report of the investigation of a large number of fire retardant systems.

High heat resistant paints—Houston Paint & Varnish Production Club. Official Digest, 251: 482-4 1945; 263 1946; 275: 721-4 1947

development of tests for paints to resist high temperature, & performance of number of paints under these conditions is given

Luminous paints:

no good architectural reference currently available

Traffic line paint—E. W. W. Richards brief description of types & properties of various traffic paints

Pavement-marking materials

detailed technical discussion of subject for those requiring full information

Color in the Building Industry

A symposium at the 27th annual meeting of the Inter-Society Color Council, March, 1958, Washington, D. C. Waldron Faulkner, FAIA, Moderator, past President ISCC.

Color in Aluminum

J. R. LEARY

Aluminum Company of America

ALUMINUM IS AVAILABLE in all forms known to the metal industries. It can be obtained in castings from die, permanent and sand molds. Aluminum forgings, wire, rod, bar, extruded shapes, sheet and plate are readily available. I believe that most of your interest lies in those three latter forms—extrusions, sheet and plate—since they are the most recognizable, versatile, and most available forms of the metal. These are known as wrought products.

Before focusing our attention on wrought products, however, I might mention the design possibilities of die and permanent mold castings. Both of these forms are being used to produce decorative detail where large quantities of identical units are required. Because of the cost of the equipment necessary, castings are economically feasible only for production in large quantities. Die casting, in particular, can produce extremely fine surfaces that require a minimum amount of preliminary treatment prior to the application of the final finish. This is also true in a lesser degree with permanent mold castings.

To return to our discussion of wrought products, let us take a look at some of the methods of producing a desirable finish. Of the three types, sheet and plate offer the greatest number of patterns. Produced as the final step in the rolling operation, these patterns can range from an extremely bright surface to one which looks almost identical to a high quality scratch brush finish. The many possible patterns can be applied to only one or both sides of the sheet or plate.

The other wrought products, extrusions, are less subject to finishing operations in the extrusion plant. A fairly uniform, flat surface is generally obtained, although the existence of longitudinal scratches, due to slight irregularities of the die surface, is sometimes apparent. These die lines generally are fairly easy to remove by either mechanical or chemical means, and the trade has generally come to accept them as a characteristic of extrusions.

The design possibilities of aluminum, in its many available forms, are increased by the fact that aluminum is easily fabricated and will take a greater variety of finishes than any other metal.

Fabrication methods for various aluminum products include forming by stamping and drawing, bending,

welding, riveting, working with machine tools, and all of the other methods known to the art of metal working. There are, of course, limitations to some of these. For example, it is not easy to weld extremely light gauges (less than 0.020" aluminum). However, gauges of this thickness can be spot welded or even bonded with some of the new adhesive materials which are becoming more and more practical as work on them advances in the laboratories of the adhesive manufacturers.

The methods of finishing include mechanical, chemical, electrochemical, electroplating, paint and lacquer and porcelain enamel. Let's go over these various methods rapidly, beginning with the mechanical methods. These include grinding, polishing, scratch-brush finish, satin finish, sand blast, hammer, tumble and burnish, as well as combinations of these methods. Generally, grinding is necessary as a preliminary step of the finishing operation and leaves the metal surface in a roughened condition. With this finish alone, aluminum is suitable for many applications, but usually subsequent operations are employed to further modify the appearance. Polishing is generally used to remove coarse marks of scratches left by grinding

or machining. Polishing operations bring the aluminum finish to a relatively high luster, although some products may be stopped along the line and be satisfactory with less than the highest luster. Scratch-brush is a coarse-lined texture that can be obtained by the application of rotating wire brushes. Satin finish is a modification of this texture, produced by the use of finer wire brush wheels or greaseless satin finishing compounds. The satin finish which is most popular imparts a soft, smooth sheen with low reflectance. Actually, the soft texture results from tiny parallel lines scratched on the metal. This finish is used quite often in the architectural field for a high quality finish. Sand blasting is a rapid and inexpensive method of finishing which imparts a uniform matte surface appropriate for some articles. Because of the roughness of such a finish, aluminum will, in time, tend to collect and retain dirt. Often, therefore, a protective coating of lacquer, clear varnish or an *Alumilite* finish is employed in order to retain the original appearance. It is extremely difficult to obtain a uniform appearance on large flat surfaces with the use of sand blasting. In addition, it has been found necessary to sand blast both sides of a piece of sheet in order to retain the necessary flatness for many applications.

Hammered aluminum has an appearance closely resembling that of hand-wrought silver. The surface of the aluminum is first covered with a layer of soot and then hammered. A final hand rubbing with steel wool produces a highlighted surface that finds its best application in novelties and giftware.

Tumbling and burnishing are generally used for articles where low selling price forbids employment of hand labor. These operations have no cutting action, but apply pressure to projecting points or particles and flatten or spread them out. Barrel tumbling is used on bulk materials, and soap, sand, gravel, rock fragments or steel shot may be used as the abrading media. Burnishing of large flat areas is done in reciprocating horizontal tanks using gravel,

sand or steel shot, or a mixture of all three, to produce the desired effect.

The second finishing method mentioned is the use of chemical finishes. One of the objectives for using chemical treatment is to improve the appearance of the aluminum by obtaining either a bright reflective surface, a smooth diffusing surface, or a rough diffusing surface. A second objective may be to eliminate dirt, grease, roll coating, heat treating film, buffing compounds or welding flux by removing a surface layer of the metal. Other objectives might be to clean without roughening or otherwise changing the surface, to remove an oxide coating or to produce a surface with increased resistance to corrosion and provide a good base for the adhesion of paints and enamels.

Among the materials and methods used to obtain some of these objectives are *Alrok* processing, bright dip process, caustic etching, acid etching and others. To take an example, let us suppose that a frosted finish is desired. This would call for an acid etch, and a mixture of nitric and hydrofluoric acids would be used. The material would be immersed in the solution for a specified length of time, depending upon the depth of frost desired. After removal, a neutralizing tank must be employed and a rinse would follow. The surface then would be extremely susceptible to marking and handling and would quite easily stain from the accidental spraying of almost any fluid or from handling. A protective coating is therefore needed. This is generally provided by either a lacquer coating or an anodic treatment.

Another method for finishing of aluminum and supplying color to the article is the use of paint or lacquer. In some cases the paint is the most economical method of obtaining the desired decorative effect, while in other cases its use is desired from the standpoint of protection, especially where severe conditions of service are encountered. The painting of aluminum follows the general technique for the painting of any metal.

When the coating is to be for decorative purposes only, very little spe-

cial preparation is needed. The surface must be clean and free from grease, and while minute defects may be covered up, relatively deep gouges caused by handling, or rather mishandling, should not be expected to be corrected by the paint or lacquer coating. When painting is done for protection, greater precautions must be taken in the preparation of the surface, and care must be exercised in the selection of the primer. Since different alloys of aluminum behave somewhat differently with respect to their ability to hold paint, minor variations in the surface preparation are advisable.

Probably the simplest method of surface preparation for outdoor applications, such as the painting of roofing materials or garage doors, is exposure to the weather for a month or so. This will effectively remove any oil film from the metal, and painting can proceed in the usual manner after cleaning the surface by brushing off any dust and dirt.

For many items, the simplest form of surface preparation can be accomplished by wiping with cloths wet with a solvent, or by immersing the article in the solvent, followed by wiping with clean cloth. This procedure is quite difficult on a commercial scale, and an improved form of solvent cleaning is available known as "solvent vapor degreasing." While this method overcomes many of the objectionable features of the ordinary solvent cleaning, it often is not sufficient for the more severe conditions. One of the most effective methods of cleaning is the use of an aqueous solution of phosphoric acid. These solutions usually contain alcohol or other additives and form a film of aluminum phosphate on the surface. This surface is inert and tends to protect the aluminum as well as to promote paint adhesion. There are a variety of preparatory treatments of this type available. In some cases, inhibited alkaline cleaners of the sodium phosphate type are employed, but they are usually followed by a dilute acid treatment to neutralize and clean from the surface any smudge produced by the alkaline cleaner.

After cleaning or otherwise treating the surface, the metal should be thoroughly dried by exposure to air or by heating before paint is applied.

Generally, it is not necessary to prime coat materials where the painting is for decorative uses only. However, a carefully selected painting system must be employed when protective measures are the main purpose of the coating. Among the primers which have been used successfully are zinc chromate primers, aluminum paint, and in some instances bituminous paints. It should be noted that the use of lead or other heavy-metal pigments should be avoided in connection with aluminum. The salts of these metals can become, under certain conditions of humidity, corrosive to the aluminum.

For finishing coats, almost any durable exterior paint or enamel may be used. Included are oil-base paints, long oil varnishes and enamels, synthetic resin finishes, and aluminum paint made with either long oil or synthetic resin varnish.

Where extremely fast air-drying finishes are required, lacquers may be used. These may be secured in a large variety of colors, including aluminum. Incidentally, these aluminum pigmented lacquers are probably the most durable, because tiny flakes of aluminum protect the lacquer from destructive sunlight.

Transparent coatings may be employed to preserve the natural appearance of aluminum or to maintain a polished finish during outdoor exposure. The coatings generally used are methacrylate resins or certain of the cellulose esters. These lacquers are especially clear and free from a yellowing tendency. At the same time, they are extremely durable for outside exposure. Higher abrasion resistance but lower weather resistance can be obtained by the use of baked urea-formaldehyde and alkyd-resin varnishes.

Recent developments have produced satisfactory vitreous enamels for application on aluminum. The relatively low melting point of aluminum and its alloys (about 1200°F. and lower) places certain restrictions on the composition of the enamel. Commercially available enamels fire

at approximately 960° to 1000°F. The selection of alloy is important because only certain of the alloys are recommended for this coating. Since the firing temperature is so close to the melting point, it makes necessary the careful support and handling of the metal during the firing operation. When warpage occurs, subsequent straightening of the pieces may be necessary and can be accomplished. Since a reasonable amount of flexing can be accomplished with spalling, certain operations such as sawing, drilling and punching can be performed on the enameled article.

Another method for finishing aluminum is electroplating. Among the many finishes obtained from this method are those which result in an attractive surface, a more wear-resistant surface, and a multitude of other desirable characteristics.

Some specific uses for electroplating are: silverplating for electrical equipment to decrease contact resistance, tin or cadmium for cable connectors, electrical contacts and soldering applications, brass for vulcanizing rubber to aluminum, copper or tin to facilitate soft soldering, chromium for reduction of friction or increased wear resistance, and zinc for threaded parts where organic lubricants cannot be permitted.

While there are a number of commercial methods for the preparation of aluminum alloys for plating with other metals, the most generally used and satisfactory method is zinc immersion. A very thin deposit of zinc is used as an intermediate layer, followed by a copper strike, before plating with the other metal. It has been found that electroplates, when properly applied to aluminum, will not blister upon heating, and the degree of adherence is greater than the cohesive strength of the base metal.

Many of the decorative electroplates are obtained by a zinc immersion dip, a copper strike, and a plating of nickel between 0.5 and 1.5 mils, followed by a chromium deposit of 0.01 to 0.02 mils in thickness. Wrought aluminum alloys plated with this system have been exposed for over 300 hours in a salt spray test, and for several years in an in-

dustrial environment without showing any lifting or blistering of the plated coatings. It is recognized, of course, that this finishing technique is more complex than that required for some other materials. In many cases, however, it has been found that this advantage is more than offset because of the lessening of other fabrication problems when using aluminum rather than another material.

The electrochemical methods of finishing aluminum are of perhaps greatest interest because of their widespread use and extreme versatility. Basically, the part to be coated is made anode in a suitable electrolyte. The differences among the methods employed today include variations of time in the processing tank, electrolyte used, temperature of the electrolyte, current density and other factors. Note that the process differs fundamentally from electroplating in that the articles to be treated are connected as anode rather than as cathode. In the anodic treatment, oxygen, instead of metal, is deposited on the article and combines with the aluminum to form aluminum oxide, integral with the surface of the article being treated.

Anodized coatings can be made both protective and decorative. While intrinsically a hard coating, the characteristics can be widely varied.

The natural color of this oxide coating will be determined by the nature of the aluminum alloy and the coating procedure. The coating will range from a clear transparent film to one that is opaque. Usually, the coating reflects the surface condition of the metal on which it is applied. Thus, a pretreatment of the part becomes a major factor in its final appearance. This pretreatment makes possible a variation of appearances within a single surface at a relatively low cost.

When first formed, the anodic coating is extremely porous. Each square foot of surface contains some sixty trillion pores with a thousand square feet of pore wall surface. To preserve the initial appearance of the coating, sealing treatments are used to close the pores and prevent staining. On the other hand, a colorant can be introduced into the

coating prior to sealing. These colored coatings provide a unique finish in which the luster of the metal shines through the color impregnated oxide. As most of you are well aware, many of the dyes and pigments available today from commercial producers are not sunfast. It is recommended that, with a few exceptions, colored Alumilite coatings be used for interior use only.

For the exceptions which I mentioned, sunfast colors have been developed for exterior architectural applications. At the moment there are available an architectural gray in four shades, blue in two shades, gold, brown, and two shades which are officially known as yellow, but which are perhaps better described as yellow chartreuse and olive drab. Extensive work is being done by the Alcoa Research Laboratories and the Alcoa Process Development Laboratories to extend this color range. Some of the work looks very promising, but is of necessity slow, since full time actual exterior exposure tests are deemed necessary before the addition of any new colors to the existing group.

Color in Porcelain Enamel

HERBERT R. SPENCER
Erie Enameling Co.

WHAT IS PORCELAIN ENAMEL? It is vitreous, inorganic coating which is bonded to metal by fusion at temperatures above 800°F. It is applied to steel at temperatures from 1300° to 1700°, and to aluminum at temperatures of approximately 950°, in current commercial practice. At these temperatures, the metal base and the porcelain enamel coating permanently fuse, thus resulting in a product with the hardness and resistive qualities of glass, along with the strength and design versatility of the base metal.

Incidentally, although steel and aluminum are the metals most commonly used, porcelain enamel can also be applied to copper, aluminized steel, stainless steel, and cast iron. Porcelain enamel is often referred to as a lifetime finish because it does not fade, stain, rust, or discolor. Add

to these properties the variety of shapes in which the base metal can be fabricated, and you have a product which is a superior one for architectural applications.

The manufacturing process is fairly simple: first, the base metal is completely fabricated to the desired shape, with all flanges welded, all corners braced, and any rough spots ground smooth. After fabrication the parts are thoroughly cleaned in a series of chemical solutions, in a process commonly referred to as "pickling." The basic material of the surface coating is called frit: this is a specially compounded glass, mostly feldspar, silica and borax, which has been quenched from a molten stage to produce crystalline fragments. The frit, together with coloring pigments, clays, and other auxiliary materials, is finely ground in a ball mill, producing a colored substance called "slip," which has the consistency of thick cream. The slip is then sprayed onto the fabricated metal panels. Following a drying process, the pieces are passed through enameling furnaces at red heat. At these high temperatures, the finely ground enamel slip fuses with the base metal to form the permanently bonded, hard, lustrous coating which we call porcelain enamel.

The history of porcelain enamel goes back many centuries. It is difficult to establish the exact beginnings of the process, since the first written reference to it is found in the ninth century, long after it had become a recognized art. The earliest enamels were all decorative in nature: Chinese porcelains were highly prized 1,000 years before Christ, and the British Museum and the Louvre both have gold ornaments and enameled jewelry from ancient Egypt and Assyria in their collections. One of the most distinguished examples of this early work is a Celtic shield in the British Museum, which was found in the Thames. It had been in the river, which is muddy and brackish, for some 2000 years when it was dredged up, yet was still in good condition.

Medieval enameling was entirely a decorative art, with many different schools and techniques flourishing—

mostly in the monasteries. The most well-known technique was that of *Cloisonné*, which apparently originated in the Byzantine School, and was later perfected by the Japanese and Chinese. *Camplévé*, a modification of this technique, was developed at Limoges, in Southwestern France, and in the Rhine Valley; and at this point, porcelain enamel began to emerge from its monastic shell. By the end of the 13th century, lay workers were doing most of the work previously done by only the monks. But even so, all enameling work was done for the church, and there was no commercial enameling at all.

In the 16th century, Limoges craftsmen developed the technique of enamel painting, and this led the way to actual commercial enameling. The Battersby enamellers, just outside of London, were the first really successful commercial enamellers, reaching a peak about 1750. However, they had never heard of market research, and as a result they concentrated on snuff boxes and patch-boxes. Market-wise, this was the equivalent of the buggy-whip, and the Battersby boys were not with us long.

Porcelain enameling did not really become an industry until it came to this country in the latter decades of the 19th century. European enamellers tended to concentrate on small pieces of decorative nature—indeed, they still tend in that direction—and it wasn't until the process was brought to this country by German immigrants that the commercial enameling of household articles became widespread. Pots and pans came first, but soon bath tubs, sinks, stoves and table tops were supplied with the new magic coating, which protected the metal so well against corrosion, scaling, or scuffing. From this, it was a short step for porcelain enamel to be used in refrigerators, signs and finally, architectural applications. In addition to this, there has been considerable use of the material in industry, where problems of corrosion, abrasion, stickiness or thermal shock have been solved by the use of porcelain enamel.

At this point I'd like to trace the early history of porcelain enamel as

an architectural material. Signs and store fronts were the earliest applications, but a number of porcelain enamel roofs were constructed in the early 1920's, largely for industrial buildings. At about this time, the possibilities of the material as an architectural exterior covering became evident, and a great deal of experimental work was carried on. The major oil companies in particular were interested in porcelain enamel for the exterior of their retail filling stations, since the porcelain enamel surface was glossy, easy to clean, and could be produced in the distinctive colors needed to provide a trade mark for these early retail outlets.

World War II interrupted the development of the architectural porcelain enamel industry; but immediately after the war, there was a tremendous increase in the use of porcelain enamel for architectural veneer applications. At the same time, zooming construction costs, coupled with the desire on the part of architects for new designs in building, resulted in a new system of construction commonly called curtain wall—a non-load-bearing type of wall system, where the wall merely encloses the building and supports only its own weight.

Now we are concerned today with color in the building industry, and more particularly with porcelain enamel as a source of that color. Here is a material with many, many advantages for all architectural applications, mainly because it is available in practically all colors, thus adding whatever accent is desired to the structure. Besides this it is durable; it withstands abrasion, moisture and all the ravages of time and weather. Being inorganic, it does not stain or fade, and it has no surface pores to collect dirt. Porcelain enamel is versatile too: it harmonizes perfectly with nearly all types of building materials, and it can be furnished in any shape that can successfully be fabricated in steel or aluminum. Finally, it is easy to erect: it is light in weight, thus minimizing framing and foundation requirements.

Porcelain enamel is not an inexpensive material. However, it is

cheaper in the long run for the type of construction we are considering. Here's why: first, the double-faced metal panels often serve as both exterior and interior wall, with no plastering or interior painting required. Second, tremendous weight savings are available with metal curtain walls utilizing porcelain enamel. Masonry structures of conventional fireproof construction weigh from 60 to 90 pounds per square foot; curtain-wall installations will weigh from 6 to 10 pounds per square foot, thus reducing foundation requirements and allowing for lighter structural steel frame work. Third, porcelain enamel curtain walls on the average are 6" thinner than conventional masonry walls, thus markedly increasing the available interior space. In the case of one particular 20-story building, an additional 7900 square foot of floor space was made available by the change from masonry to curtain wall design. Fourth, erection is fast and economical. Larger wall areas per man hour are actually enclosed, which means that the building can be closed in and occupied at a much earlier date. Fifth, the overall cost of the structure is lower: the porcelain enamel curtain wall by itself is more expensive per square foot of wall area, but it permits less elaborate foundations, lighter structural steel framing, fewer joints, lower erection costs, and reduced maintenance expenses after occupancy of the building. Lastly, the freedom of design made possible by the use of porcelain enamel curtain walls allows architects more effective expression of the exterior elements in any structure.

This is particularly true in the area of color choice. Architects want to use color to give an added dimension to their work: therefore, it is not surprising to find that a survey conducted by the Research Advisory Service of The American Institute of Architects, covering 711 architects, indicated that, if specifying metal panels, 99% of them would use colored panels, and 95% would use color even at extra cost.

In order to make porcelain enamel an increasingly durable, colorful material, numerous research and

testing projects are carried on at the National Bureau of Standards under the supervision of the Porcelain Enamel Institute (PEI), which maintains two associate fellows at the Bureau. These tests cover such subjects as abrasion-resistance, weathering tests, color research, etc.

The PEI project which is perhaps of the most interest to you, is the establishment of an architectural color series. A committee of the Architectural Division of PEI has been working on this project for over a year now, with the avowed purposes of establishing a range of colors, not limiting in nature, which may be used by architects and designers as a guide in selection of appropriate colors. This PEI color series will be coded into the Munsell System, and probably the Ostwald System, too, in order to eliminate descriptive names, and to pinpoint the exact location of the color in any range chart. To our knowledge, this is the first time any group of colors has been established exclusively on a coded basis.

Another project is the National Bureau of Standards weathering test, which was started in 1940 to determine the relative weatherability of various grades of porcelain enamel, and to develop suitable criteria for testing, measuring, and evaluating weather-resistance. The results of the first 15 years of testing are now available, and they clearly indicate that porcelain enamel finishes with an acid-resistance of Class A or AA, as tested in accordance with the PEI weathering test, will withstand rain, smoke, sun or weather with no fading, blistering or loss of gloss.

In summary, the future for architectural porcelain enamel, in our opinion, is rosy. Not only will there be a tremendous growth in the use of metal curtain wall panels, and particularly porcelain enameled panels, but also there has been a tremendous awakening on the part of the American public to the esthetic possibilities inherent in architectural colors. Furthermore, the development of new methods and processes, of which porcelain enamel on aluminum is only one example, promises further advances in this field.

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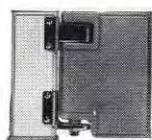
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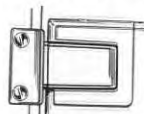
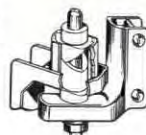
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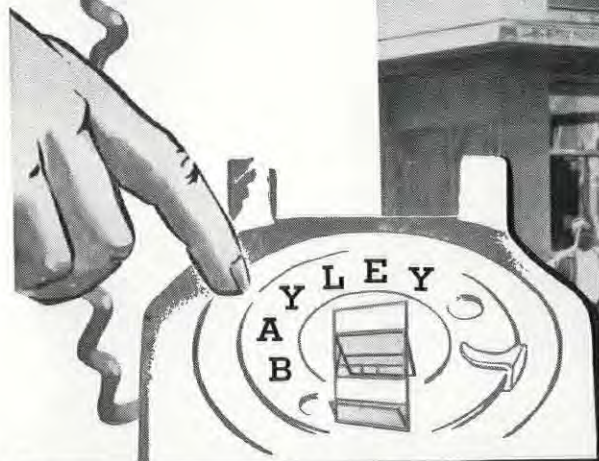
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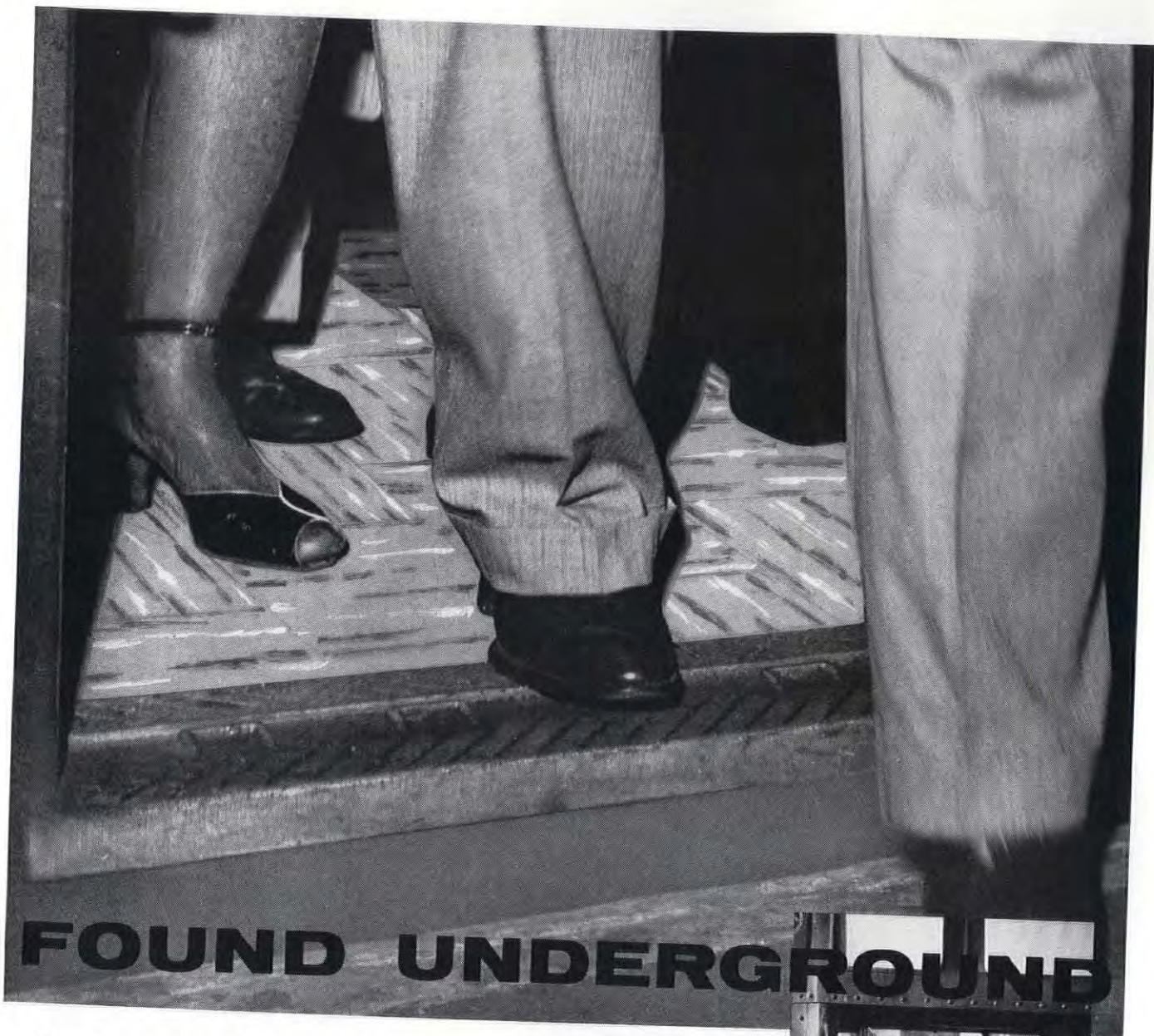
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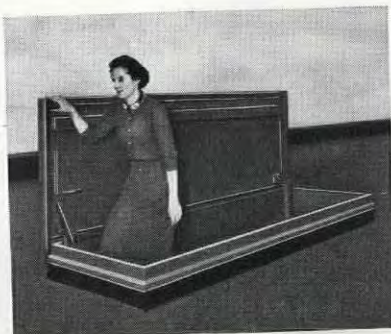
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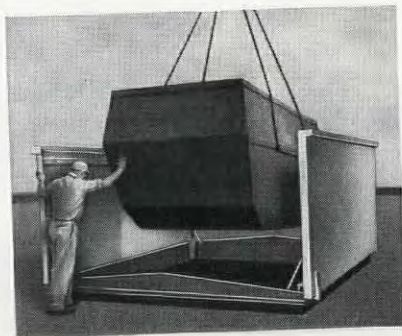
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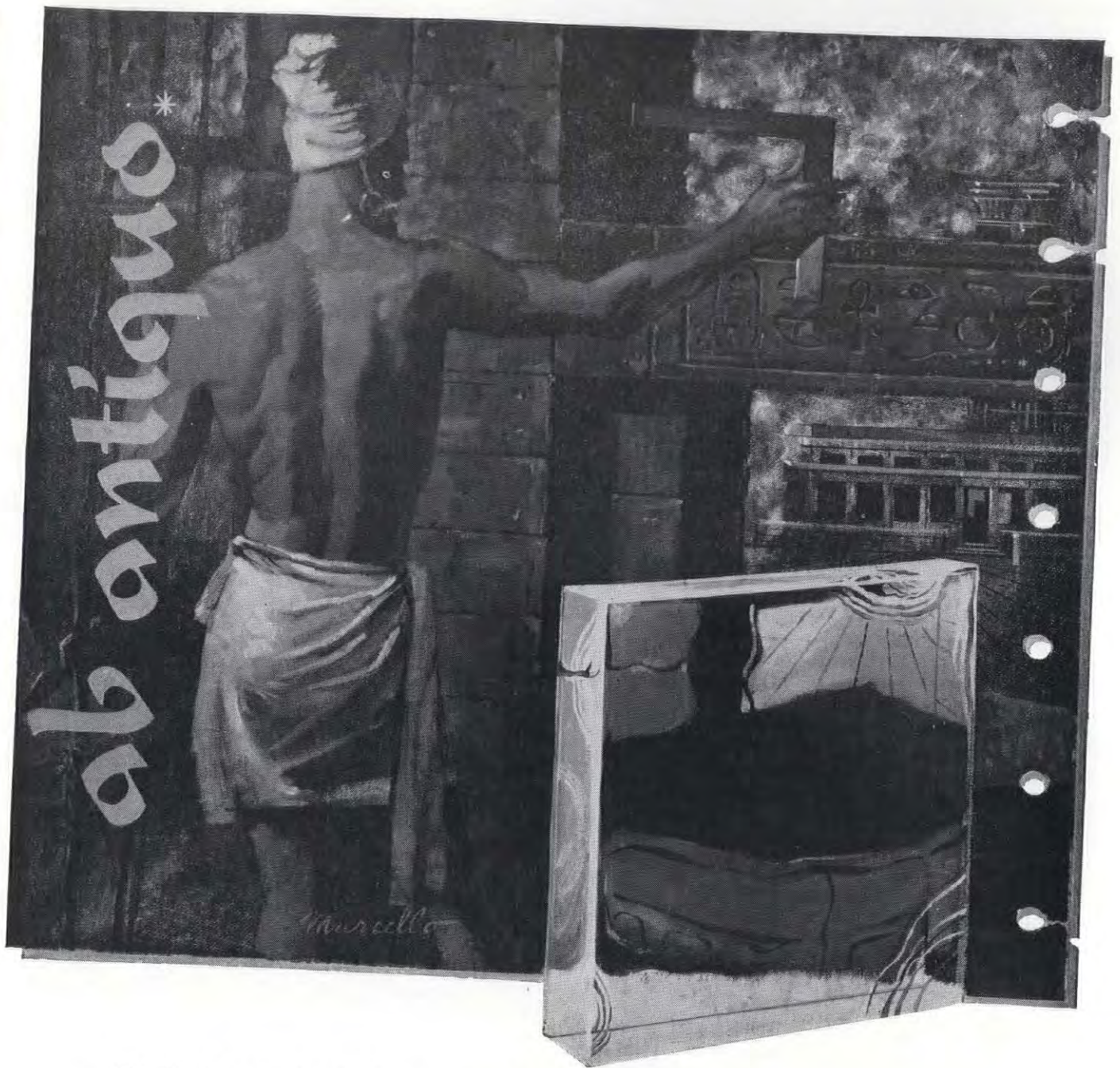
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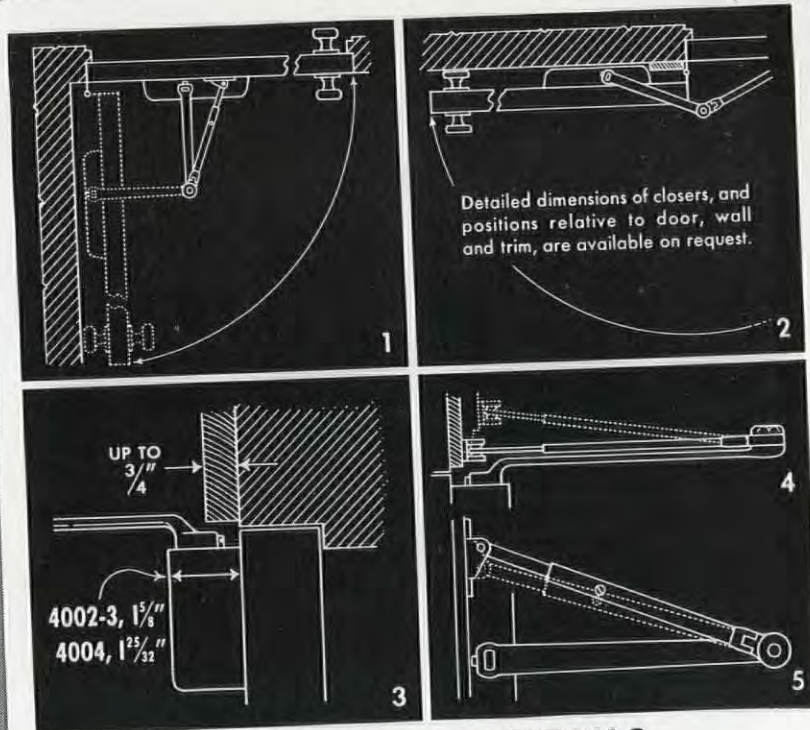
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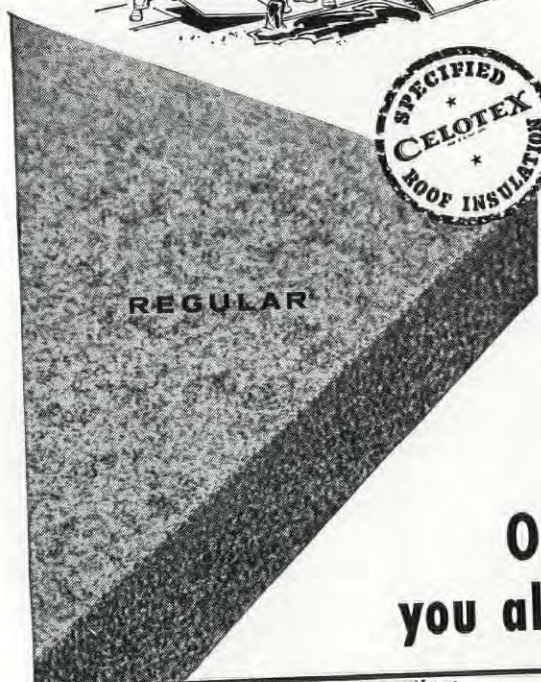
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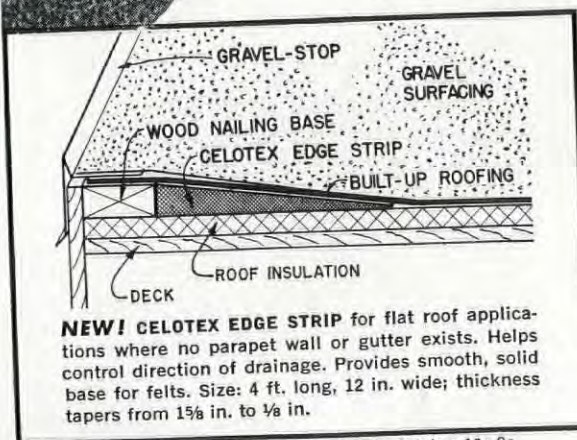
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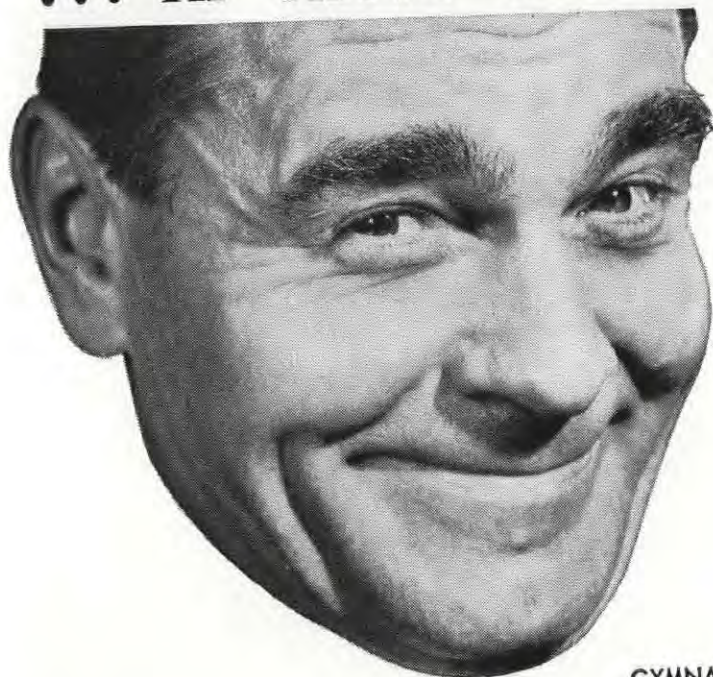
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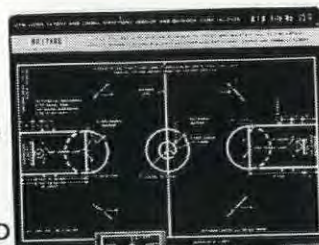
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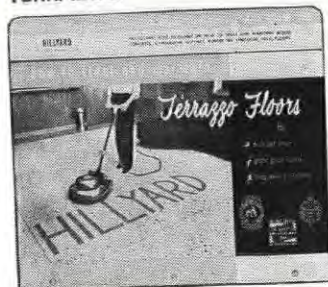


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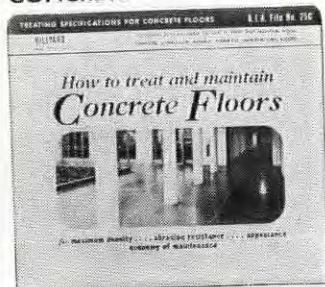


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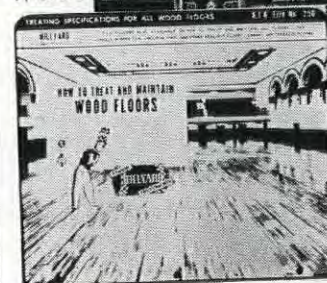
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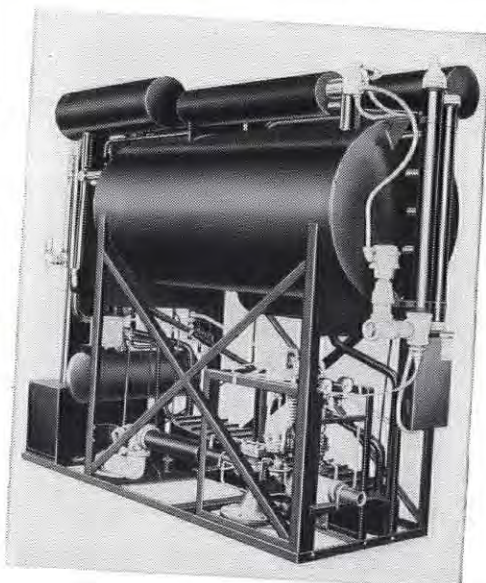
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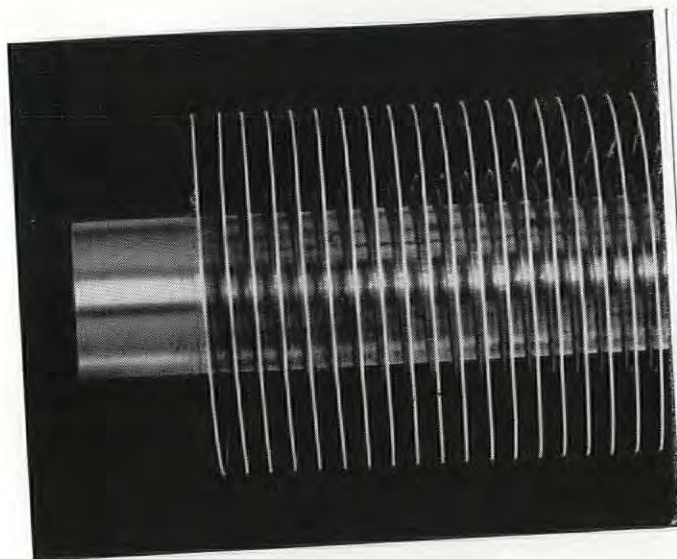
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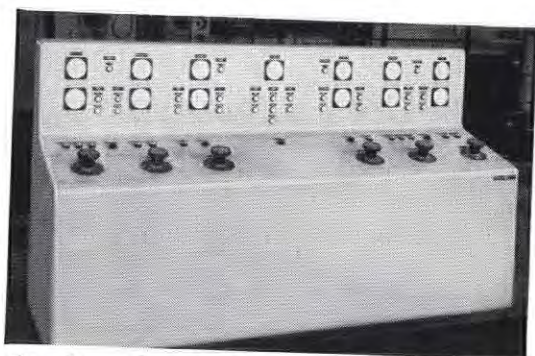
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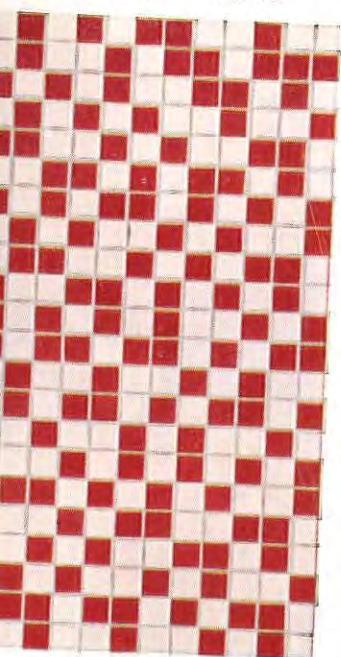


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